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PART II

DEPARTMENT OF THE TREASURY

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EFFECTS OF OIL IMPORTS ON NATIONAL SECURITY

Publication of Report of Investigation

[4810-25-M]

DEPARTMENT OF THE TREASURY

Office of the Secretary

EFFECTS OF OIL IMPORTS ON NATIONAL SECURITY

Publication of Report of Investigation To Determine the Effects on the National Security of Oil Imports

Notice is hereby given pursuant to section 232(d) of the Trade Expansion Act of 1862, as amended, 19 U.S.C. 1962, and 31 CFR 9.9, of the publication of a report by the Secretary of the Treasury to the President of an investigation under section 232(b) of the same Act. The Secretary of the Treasury initiated this investigation on March 15, 1978, to determine the effects on the national security of imports of crude oil, crude oil derivatives and products, and related products derived from natural gas and coal tar (referred to collectively as "oil"). The report to the President, dated March 14, 1979, states that oil imports are entering the United States in such quantities and under such circumstances as to threaten to impair the national security. Accordingly, the report recommends that action be taken to reduce domestic oil consumption and increase domestic production of oil and other sources of energy, by providing appropriate incentives and eliminating programs and regulations which inhibit the achievement of these goals. The report notes that specific recommendations on achieving these conservation and production objectives are being evaluated in an interagency group charged with presenting the President with policy options for his consideration.

The Secretary's report to the President is based on the investigation conducted by the General Counsel of the Treasury Department. The General Counsel's report of that investigation examines the nation's growing dependence on imported oil, particularly since 1975, when Secretary of the Treasury Simon reported to President Ford that oil imports threatened to impair the national security, and concludes that the threat to the national security is greater now than before.

During the course of his investigation, the General Counsel solicited (see 44 FR 7264 (1979)) and considered comments from the public as well as from a number of agencies. The agencies' comments are appended to the General Counsel's report. The Secretary's report to the President and the General Counsel's report are published herein and copies thereof are available through the Office of Public Affairs, Department of the Treasury, by contacting the individual listed at the conclusion of this notice. Comments received from other agencies and the public in the course of this investigation are available for public reading and copying at the Library of the Treasury Department, Room 5030, Main Treasury, 15th and Pennsylvania Avenue NW., Washington, D.C.

The principal authors of these reports were Leonard E. Santos, Dell V. Perry, William E. Steger, Cathryn A. Goddard, Ernest F. Chase, and Barry S. Newman of the Office of the Secretary of the Treasury. Contact Alvin M. Hattal, (202) 566-8381.

Dated: March 21, 1979.

ROBERT H. MUNDHEIM,
General Counsel.

MEMORANDUM FOR THE PRESIDENT FROM THE SECRETARY OF THE TREASURY

SUBJECT: REPORT OF SECTION 232 INVESTIGATION ON OIL IMPORTS

MARCH 14, 1979.

I have completed the investigation I initiated last year pursuant to Section 232 of the Trade Expansion Act of 1962 to determine whether oil* imports are entering the United States in such quantities or under such circumstances as to threaten to impair the national security. I am transmitting herewith a detailed report of our investigation.

On January 14, 1975, acting pursuant to the same Section 232 authority, Treasury Secretary Simon found that the nation's dependence on imported oil was so great as to threaten to impair the national security and recommended to President Ford that action be taken to remove the threat. That conclusion is, unfortunately, even more valid today.

The nation's dependence on imported oil has increased dramatically since the 1975 finding. At the time of Secretary Simon's finding, 37 percent of United States demand for oil was supplied from foreign sources. In 1978, oil imports accounted for 45 percent of oil consumed in the United States. During that same period, the nation become more depandent on oil to meet overall energy demand, and oil imports increasingly originated in a small number of distant foreign countries. The increasing dependence on foreign sources of oil is a consequence of both rising levels of consumption and declining domestic production.

This growing reliance on oil imports has important consequences for the nation's defense and economic welfare. Because so much of the oil used in the United States originates thousands of miles away, supplies are vulnerable to interruption from a variety of causes. Recent developments in Iran have dramatized the consequences of this excessive dependence of foreign sources of petroleum. Furthermore, the rising level of oil imports adversely affects our balance of trade and our efforts to strengthen the dollar; in 1978, outflows of dollars for our oil imports amounted to $42 billion, $15 billion more than in 1975 and offsetting much of the rise in our exports of industrial and farm products.

The continuing threat to the national security which our investigation has identified requires that we take vigorous action at this time to reduce consumption and increase domestic production of oil and other sources of energy. To the extent feasible without impairing other national objectives, we must encourage additional domestic production of oil and other sources of energy, and the efficient use of our energy supplies, by providing appropriate incentives and eliminating programs and regulations which inhibit the achievement of these important goals.

Specific recommendations on achieving these conservation and production objectives are being evaluated by an interagency group in which Treasury is participating. The committee's work will be finished shortly and specific policy options will be formulated for your consideration.

W. MICHAEL BLUMENTHAL.

REPORT OF INVESTIGATION UNDER SECTION 232 OF THE TRADE EXPANSION ACT, 19 U.S.C. 1862, AS AMENDED

I. INTRODUCTION

1. Background.

Section 232(b) of the Trade Expansion Act of 1962 authorizes the President to take action to adjust imports of crude oil, crude oil derivatives and products and related similar products derived from natural gas and coal tar (hereinafter referred to collectively as "oil") if the Secretary of the Treasury finds that such commodities are being imported into the United States in such quantities or under such circumstances as to threaten to impair the national security.

Previous findings that oil imports threaten to impair the national security were made in 1959 and 1975.[1] Those findings have served as the basis for programs to control oil imports, first by means of quotas and later through use of license fees.[2] The use of license fees was upheld by the United States Supreme Court in an opinion which emphasized the breadth of the remedies permitted under Section 232(b).[3] On its face, Section 232(b) authorizes any remedy reasonably related to the adjustment in the importation of a particular article.

*The term "oil", as used in this report, means crude oil, crude oil derivatives and products, and related products derived from natural gas and coal tar.

This investigation was initiated by the Secretary of the Treasury on March 15, 1978 (see Appendix A—Order Initiating Investigation) to examine developments since 1975 and to determine:

1. Whether increased reliance (since 1975) on oil imports from a small number of distant foreign suppliers continues to threaten to impair the national security;
2. Whether the monetary repercussions accompanying continued large payments outflows for oil imports threaten to impair the national security.

At the time he initiated the investigation, the Secretary of the Treasury stated that the investigation was to be undertaken for contingency purposes only and that it should be conducted on a confidential basis. Initially, in the Secretary's judgment, national security interests required that public comments not be invited. Accordingly, the Secretary requested the General Counsel to proceed immediately with the investigation. Information and advice were solicited from the following agencies in the course of the investigation: Central Intelligence Agency, Department of Defense, Department of Energy, National Security Council, Federal Reserve Board, Department of State, Council of Economic Advisers, Department of Commerce, Department of Labor, Department of the Interior, and Department of Transportation. On February 2, 1979, the Secretary invited comments from the public, having reviewed his earlier determination and concluded that it was then appropriate to issue the invitation. None of the agency submissions or public comments challenged the proposition that oil imports threaten to impair the national security. The overwhelming conclusion of these submissions and comments is that such a threat continues to exist.

2. Conclusion.

The conclusion of this report is that oil continues to be imported in such quantities and under such circumstances as to threaten to impair the national security. This threat arises both from increased reliance on a small number of foreign oil suppliers and the monetary repercussions accompanying continued large payments outflows for imported oil. Unlike temporary crises in the nation's ability to satisfy its oil import needs, the national security threat arising from growing reliance on imported oil has its gravest implications in the long-term.

II. INCREASED RELIANCE ON OIL IMPORTS FROM A RELATIVELY SMALL NUMBER OF FOREIGN SUPPLIERS THREATENS TO IMPAIR THE NATIONAL SECURITY

1. A threat to the national security has previously been established.

The 1959 finding. In 1959, the President's Special Committee to Investigate Crude Oil Imports determined that oil imports constituted a threat to the national security.[4] The Committee concluded that, in order to have enough oil to meet the nation's security needs, "there must be a limitation on imports that will insure a proper balance between imports and domestic production . . . [Absent that balance,] in an emergency the nation would be confronted with all of the liabilities inherent in a static, as contrasted with a dynamic, mobilization base, including the delays, waste and inefficiency that accompany efforts to stengthen any part of the mobilization base on a 'crash' basis." [5]

The 1975 finding. In 1975 the Secretary of the Treasury found that oil imports threatened to impair the national security. That investigation considered all factors relevant to a finding under Section 232(b), including the relationship of the nation's economic welfare to its national security. The Treasury report concluded that oil imports should be reduced in order to "wean ourselves away from a dependence upon imported oil, conserve our use of petroleum, promote the use of alternative sources of energy, and at least in part, stanch the outflow of payments resulting from our purchases of this commodity." [6]

Congressional declarations. In August 1977, Congress, in enacting Title I of the Department of Energy Organization Act, declared that the "energy shortage and our increasing dependence on foreign energy supplies present a serious threat to the national security of the United States." [7] This declaration echoed an earlier Congressional finding in section 2 of the Emergency Petroleum Allocation Act of 1973 that oil shortages will create severe economic dislocations and hardships which constitute a national energy crisis threatening the public health, safety and welfare.[8] More recently, section 102 of the National Energy Conservation Policy Act of 1978 emphasized the need to stem the nation's increasing reliance on imported oil and the vulnerability which accompanies such reliance.[9]

2. The nation has increased its dependency on a small number of distant foreign oil suppliers.

Since 1975, United States oil imports have increased as a share of oil consumed and of all energy consumed in the United States. In addition, because oil imports increasingly originate from a small number of foreign and mostly distant sources, they have become more vulnerable to interruption.

Level of oil imports. Oil imports have risen steadily over the past 20 years.[10]

1959	1.8 mmbpd (million barrels per day).
1975	6.5 mmbpd.
1978	8.7 mmbpd (including the Strategic Petroleum Reserve).

Over the same period, oil imports have increased both as a share of domestic demand for oil.[11]

1959	18%
1975	39%
1978	45%

and as a share of demand for energy of all types.[12]

1959	9%
1975	19%
1978	23%

A growing share of our oil imports come from OPEC nations: [13]

1959	70%
1975	78%
1978	83%

Oil imports averaged 8.7 mmbpd during 1978—down 6 percent from 1977.[14] However, this decline resulted from a rundown of domestic inventories and a one-time buildup of Alaskan production which more than offset the 1.6 percent rise in domestic oil demand and the 4 percent decline from 1977 in the crude oil production of the lower 48 States.[15] Alaskan oil, which began to flow in June 1977, approached the capacity pipeline flow of 1.2 mmbpd in the second quarter of 1978.[16]

Sources of oil imports. In the early 1960's, Venezuela was the largest external supplier of oil to the United States, providing about 46 percent of total oil imports.[17] Later Canada (non-OPEC) became a large supplier, accounting for about 22 percent of imports by 1970.[18] However, imports from Venezuela have declined sharply as a percentage of total imports, and Canada has adopted procedures which could virtually phase out all light crude oil exports to the United States by 1981.[19] As imports from these traditional Western Hemisphere suppliers have receded in significance, there has been a corresponding rise of the nation's reliance on Eastern Hemisphere sources, particularly those in the Middle East. The proportion of oil imports originating in Middle Eastern countries was: [20]

1959	21%
1975	27%
1978	34%

For the next decade, the United States will probably continue to rely heavily on Middle Eastern supply sources. Although recent developments in Iran have diminished expectations for continuing the previous levels of production in that country, in all likelihood, U.S. dependence on other Middle Eastern producers will increase further.[21]

As oil production in the United Kingdom and Norwegian sectors of

the North Sea develops, some demand for Middle Eastern oil will shift to North Sea oil. However, the changeover is likely to have its greatest effect on the European markets, with substantial U.S. reliance on Middle Eastern oil remaining relatively undiminished. The expanding production in Mexico, for which the United States forms a natural market,[22] offers another alternative to imported Middle Eastern oil. Nevertheless, through 1985, U.S. dependence on Middle Eastern producers is not expected to be reduced significantly because of the development lead time required.

Value of oil imports. Not only has the volume of U.S. oil imports expanded, but the landed price of foreign petroleum has jumped sharply as well. For example, the average unit value (f.a.s.) of U.S. petroleum imports has risen as follows: [23]

1959	$2.26 pb (per barrel).
1975	$11.45 pb.
1978	$13.28 pb.

As a consequence, the nation's annual oil import bill has grown dramatically over the past 20 years: [24]

1959	$1.5 billion.
1975	$27.0 billion.
1978	$42.3 billion.

The cost of oil imports may be expected to increase further in 1979 as a result of the OPEC price increase of 14.5 percent—fourth quarter to fourth quarter—agreed upon at the meeting of OPEC ministers in December. Recent interruptions in Iranian production have put upward pressure on market prices and have prompted many oil producers to seek to obtain price increases beyond those scheduled in the December OPEC price decision.

3. The risk of detrimental interruption has not lessened.

Risk of interruption. As noted above, the U.S. is heavily dependent for its imported oil on a small number of distant countries. These countries are a diverse group of nations with different resources and goals. While, in the main, the U.S. shares common interests with them, there are also some areas of political disagreement. In 1973, some of these countries demonstrated their willingness to use oil as a political weapon. For the first time in history, this country's access to major petroleum supplies was cut off by an embargo, as a result of dissatisfaction with our foreign policy. This action was prompted by a major military conflict in the Middle East. Although hostilities have generally subsided, the underlying political dispute has not yet been resolved. Despite the intervening years and strengthened relations with Middle Eastern nations, the United States cannot discount the possibility of another political disagreement with the nations on which it depends for its oil supplies.

In addition, recent developments in Iran have highlighted the potential for internal domestic upheavals to disrupt oil supplies. As a result of the events beginning with a strike in October 1978, Iranian exports until very recently have been limited to small amounts of heavy residual oil not usable within Iran. Although Iranian oil exports have been renewed, the Iranian government has stated its intention to limit oil exports to 3 mmbpd, well below the 5 mmbpd level that prevailed before the interruptions. Even though Iranian oil accounted for only 5 percent of U.S. oil consumption prior to December 1978, Secretary Schlesinger recently indicated that the continued interruption of even this relatively less important U.S. supply source could require the U.S. to consider mandatory conservation measures. This assertion serves to emphasize, as the Central Intelligence Agency has noted, the vulnerability of the U.S. economy to supply disruption. See Appendix B—Compilation of Agency Submissions.

Furthermore, other types of supply interruption are possible. For example, six of the Middle Eastern nations which are major suppliers of oil to the U.S. ship their oil through the narrow Strait of Hormuz at the southern end of the Arabian Gulf.[25] This geographical situation alone renders this oil supply route vulnerable. Moreover, the producing nations themselves face a risk of terrorist action with attendant harm to oil production and shipment facilities. Indeed, the Central Intelligence Agency has stated:

> There is a high probability that acts of nature, human error, or deliberately targeted terrorist attack will interrupt the flow of oil in one or more of the oil exporting nations during the next several years.
>
> Interruptions of oil supply owing to guerrilla operations, acts of terrorism, or acts of nature are not likely, by themselves, to be of a magnitude and duration which would result in severe economic disruption of Free World economies, though they could exert strong upward pressure on prices in a tight world oil market. Extensive terrorist action against key oil storage and transportation facilities in the Persian Gulf could, in particular, significantly affect the market by substantially reducing oil supplies for the time required to put those facilities back into operation, which could be several months.

See Appendix B—Compilation of Agency Submissions.

According to the Defense Department:

> The concentration of oil production facilities in the area presents the major physical risk. This creates a risk of interdiction, or even the risk of natural or accidental disturbances. The extensive damage in the Abqayq fires in May and June 1977, caused by accident, highlights the fragility of these facilities. Destruction of key facilities could cause major interruptions of oil deliveries to the U.S. and to our NATO and Japanese allies which would adversely affect U.S. and Western World political, economic and military security.

See Appendix B—Compilation of Agency Submissions.

In short, the overall potential for an embargo or other interruption has not decreased since the embargo of 1973, nor since the 1975 finding by the Secretary of the Treasury that such a risk threatened to impair the national security. On the contrary, developments in Iran demonstrate that U.S. oil imports can be seriously affected by internal disruptions in a country even if it is not a primary supplier of the U.S. oil imports. Disruption in any source of supply serves to concentrate U.S. reliance on the other supply sources and, at a minimum, leads to unscheduled price increases, thereby increasing the nation's vulnerability.

Strategic petroleum reserve only recently initiated. Congress has ordered the establishment of a Strategic Petroleum Reserve (SPR)[26] to reduce the impact of a potential interruption. However, the reserve currently contains only about 77 million barrels, or 7.7 percent of the one billion barrel goal proposed by the Department of Energy for 1985.[27]

International Energy Agency Sharing Plan gives limited protection. To minimize the effect on member countries of oil shortages created by an embargo or other circumstances, the United States and the 19 other International Energy Agency (IEA) member countries have agreed to an International Energy Program under which allocation of oil and mandatory demand and restraint measures can be triggered when the group as a whole sustains a 7 percent reduction in oil import supplies or when any one country (or group of countries) sustains a 7 percent reduction in its oil supplies.[28] Each country is required to have demand restraint mechanisms in place that are capable of reducing its oil consumption by 7 percent—about three and one half mmbpd for the IEA countries as a group based on IEA estimates of probable 1980 consumption. The supply sharing mechanism is coupled to the activation of the demand restraint program. In addition, countries have the obligation to build stocks equivalent to 60 days of imports.

The interruption of Iranian oil exports has not led to activation of the IEA oil-sharing agreement. Nevertheless, IEA member countries are greatly concerned regarding the current situation in the oil market, which has brought severe pressure on prices. Accordingly, the IEA Governing Board,

meeting on March 1-2, 1979, agreed that IEA countries would promptly reduce their demand for oil on the world market by about 2 mmbpd. This amount corresponds to about 5 percent of IEA consumption. The share of the U.S. in this reduction would be just under one mmbpd.

The degree of protection afforded by the combined SPR and IEA sharing plans depends on a number of variables, including the amount of oil stored at the time of any interruption, as well as the magnitude and length of the interruption. The current level of protection afforded by the existing SPR and contingency conservation plans is limited. Because of the relatively small inventory in the SPR at the present time, conservation contingency plans take on added significance as a means of meeting our March 2 commitment to the IEA or, more generally, our potential commitment under the provisions of the IEA. Besides measures to reduce oil consumption by encouraging the use of natural gas, which is temporarily in surplus, and by shifting to non-oil generated electric power, the Administration has submitted to Congress for approval three contingency conservation plans. These three conservation plans, which were submitted on March 1, are estimated to save as much as 614,000 bpd. It is anticipated that these demand restraint plans will play a significant part in achieving the consumption reduction agreed upon on March 2 or in meeting our obligations in case of activation of the international sharing plans.

Impact of the National Energy Act on oil imports. It is estimated the National Energy Act will save between 2.4 and 3.0 mmbpd of oil imports by 1985. Sizeable savings will occur from the displacement of imported oil by additional supplies of domestically produced natural gas. This potential displacement is estimated to be in excess of one mmbpd. Increased gas supplies are anticipated to result primarily from provisions in the National Energy Act which raise the prices of natural gas and permit tapping supplies, formerly available only to the intrastate market, for the interstate market.

At the beginning of 1979 there were variously estimated to be between 1 and 1.4 trillion cubic feet of additional natural gas supplies immediately available as a result of the National Energy Act.[29] If these supplies were promptly put to use, they could displace over 500,000 bpd of imported oil for the next two or three years. However, there is uncertainty as to how much oil consuming equipment can be physically converted to use the additional gas and whether or not such conversion will be practical for the short term.

In summary, while the provisions of the National Energy Act are estimated to reduce oil imports by about 2.5 mmbpd by 1985, for the immediate future, reductions in oil use will be modest and will not significantly lessen U.S. vulnerability to disruptions in foreign supply.

Limited possibilities for the development of alternative energy sources. Despite national programs to encourage use of alternative energy sources, immediate savings from conversion to other fuels are limited by the time required to change existing energy-using capital stock, *i.e.*, industrial equipment, buildings, and transportation vehicles. For example, the conversion of industrial plants and electric utilities from oil and gas use to coal is slow, costly and constrained by environmental considerations. Thus, despite the recent emphasis on shifting the source of energy in major oilburning installations, the use of oil in utility plants increased from 396 mmb in 1971 to 624 mmb in 1977.[30]

In the last decade, nuclear generating capability has grown, but nuclear power's share of domestic energy production remains small. The power generated from nuclear plants increased from 38.1 billion kilowatt hours in 1971 to 250.9 billion kilowatt hours in 1977.[31] Even so, nuclear sources provide only about 4 percent of total energy production.[32] As the United States' nuclear capability increases, demand for oil and gas by utilities may decline, but at a slow rate. In addition, the lead time currently required for placing a nuclear power plant in operation is 10-12 years.[33] Overall, the provisions of the National Energy Plan anticipated that nuclear power would reach an oil equivalent of 3.8 mmbpd by 1985, up from 1.0 mmbpd oil equivalent in 1976.[34] However, more recent projections of nuclear power generation provided by the Energy Information Administration to Congress are somewhat lower.[35]

To date, renewable sources of energy, such as solar, wind, and geothermal, have not made significant contributions as substitutes for oil and gas. The 1977 National Energy Plan forecasts that these domestic energy supplies will increase from 1.5 mmbpd of oil equivalent in 1976 to 1.7 mmbpd oil equivalent in 1985.[36] This increase of only 200,000 bpd of oil equivalent indicates that any significant energy contribution from such new sources will not take place until after 1985.

Expanded domestic production hampered under current conditions. Domestic production of crude oil has declined, from a peak of 9.6 mmbpd in 1970 to 8.7 mmbpd in 1978, despite the addition of production from the Alaskan North Slope.[37] Production from Alaska began in 1977 and by 1978 reached the current design capacity of the Alaskan pipeline of 1.2 mmbpd. Absent further incentives for the sale of Alaskan crude, production is estimated to remain at this level offering no further offset to the decline in production in the lower 48 states.

Of particular concern is the rapid decline of lower tier "old" oil production under the current pricing structure. The production of old oil is important because it constituted over 50 percent of domestic production at the beginning of 1977.[38]

Production of old oil was projected to decline from 3.5 mmbpd in 1978 to 1.95 mmbpd by1985, an annual decline rate of 8 percent over the seven year period.[39] However, Treasury studies have placed the actual annual decline rate for old oil at over 16 percent for the 12 month period beginning in December 1977. Decline rates are greatly influenced by the economics of production which may account for the abnormally high rates experienced in recent months.

Proven domestic reserves of crude oil have declined steadily from 39 billion barrels in 1970 (at the time of the Alaskan North Slope discovery) to an estimated 29.5 billion barrels at the end of 1977.[40] Moreover, subsequent to the discovery of oil at Prudhoe Bay, the new reserves added each year have not equaled annual production. The outlook for discovering significant quantities of new domestic petroleum reserves is uncertain from a geological standpoint.[41] Undiscovered oil resources in the U.S. are estimated to range from 46 to 143 billion barrels with a median amount of roughly three times the current proven reserves.[42] New reserves can only be proven by drillings. In addition, there is a significant potential for enhanced recovery from known deposits of oil.

Domestic production from existing wells has been hampered by price regulations that discourage some categories of marginal production. There are indications that at $15 per barrel (1976 $), enhanced production may amount to as much as 1.5 mmbpd by 1990.[43] In addition, the entitlements program, designed to equalize the price of imported and domestic crude oil to domestic refiners, has in fact encouraged oil consumption by indirectly subsidizing purchasers of foreign oil.[44]

Under the current pricing structure, there appears little prospect for substantially increasing oil production or even stemming the natural decline of old oil. On the other side of the supply-demand system, conservation measures taken to date have not been sufficient to slow the rise in demand adquately. Thus, the nation's current prospects of reducing its vulnerability

to interruptions in oil imports are not promising.

4. The impression of vulnerability created by the nation's seeming inability to control its increasing dependence on oil imports directly affects the nation's defense and foreign policy.

The United States' increasing reliance on foreign oil is perceived by its industrialized allies, the developing world, the Soviet bloc and the oil exporting countries themselves both as a sign of weakness and of a lack of internationally cooperative behavior. This perception works to the nation's disadvantage in terms of its national defense and its foreign policy.

National Defense. The Department of Defense has described the national defense impact of the nation's dependence on imported oil:

> The threatened impairment of the national security must be assessed not only in terms of the domestic capability to support national defense needs * * * but also in terms of international perceptions. Other countries make decisions on foreign relations and defense matters based upon their perception of our strengths. The impact of petroleum import * * * [dependency] on the United States could alter these perceptions significantly causing them to misjudge U.S. intentions. Such decisions would affect directly the security of the United States.

See Appendix B—Compilation of Agency Submissions.

The State Department concurred that dependence impairs the national defense:

> Our treaty obligations, particularly those that relate to mutual security, require the United States to be able to conduct an effective defense of its own interest and to make an effective contribution to the defense of its allies. Heavy dependence on imported oil can create doubts about our ability to sustain prolonged conflicts and assist our allies in an optimum way.

See Appendix B—Compilation of Agency Submissions.

Foreign policy. The dependence of the nation on imported oil also adversely affects its ability to achieve its foreign policy objectives and fulfill its international obligations. Other countries may doubt this country's resolve to fulfill political commitments or respond to challenges when the contingencies to which it may have to respond could affect the availability of oil. Respect for the United States' ability to take charge of its energy problem is critical to maintaining a position of world leadership. The State Department reported:

> It is our view that the current oil import situation impairs our ability to achieve our foreign policy objectives, both economic and political . . . Moreover, the way in which we deal with this situation is widely regarded by other countries as a test of United States leadership and determination to play a constructive role in international relations.

See Appendix B—Compilation of Agency Submissions.

5. Conclusion. The nation's current and projected dependence on foreign oil is appreciably greater than when past findings determined that dependence on foreign oil threatened the national security. The risk of interruption has not significantly lessened, and measures to reduce substantially the impact of interruption are not yet in place. The threat to the national security is thus greater now than at any time in the past.

III. THE MONETARY REPERCUSSIONS OF EXCESSIVE DEPENDENCE ON IMPORTED OIL THREATEN TO IMPAIR THE NATIONAL SECURITY [45]

1. The efforts of the U.S. to strengthen the dollar at home and abroad are being hampered by the excessive dependence on imported oil.

Efforts to strengthen the dollar. Although the United States is pursuing a broad array of policies to establish the fundamental economic conditions for a strong dollar, these efforts are being hampered by excessive dependence on imported oil. A program of monetary and fiscal restraint, supplemented by voluntary wage-price programs, is being implemented to bring inflation down and achieve a more sustainable economic expansion. This will contribute to a substantial reduction in the U.S. trade and current account deficits, which is a prerequisite for the maintenance of a strong and stable dollar. A new export promotion program is expected to help increase exports further. However, curbing this country's reliance on imported oil is essential to any major and lasting improvement. As pointed out in a previous section, the actual cost of annual oil imports increased nearly thirtyfold from 1959 to 1978, from $1.5 billion to about $42 billion. In 1978, oil imports represented roughly 25 percent of the total imports of the United States and amounted to about one and a quarter times the total merchandise trade deficit.

In 1979, oil import costs are expected to rise substantially. The December 1978 OPEC price hike alone will add about $4 billion to the cost of U.S. oil imports during 1979 and even more in 1980. The disruption in world supply patterns due to political developments in Iran has already led to some further price rises and created the risk of substantial increases.

The continuing excessive dependence on imported oil is making it more difficult to achieve U.S. economic objectives. The rising price of imported oil increases inflationary pressures by directly raising costs and by heightening inflationary expectations. Uncertainties about supplies and costs hamper confidence and inhibit investment required for non-inflationary growth. The growth of oil imports puts greater adjustment burdens on other elements of the U.S. balance of payments since it greatly increases the need for expansion of exports or decreases in other imports. With reduced dependence on oil imports, the U.S. economy could maintain appropriate levels of growth and grow faster with a lower inflation rate and a stronger dollar.

Exchange market perceptions. Because of its impact on the U.S. trade and current account deficits, excessive and growing U.S. dependence on oil imports increases the danger of reduced confidence in the dollar and makes the dollar more vulnerable to downward pressures in the foreign exchange market.

If downward pressures on the dollar were to become so severe as to damage world confidence in the dollar, the national security of the United States would be impaired. The dollar serves as the principal international currency for the world economy. The dominant share of world trade is denominated in dollars. About three-fourths of all medium- and long-term borrowing in international capital markets is in dollars. The IMF indicates that nearly 80 percent of official foreign currency reserves held by foreign central banks is in dollars. Thus, loss of confidence in the dollar, if widespread, would be likely to precipitate sudden and large-scale international capital flows in ways which would be disruptive to the banking system and world financial markets. The danger of resort to restrictive measures which would jeopardize the open trade and payments system would be greatly increased.

As the Federal Reserve Board has indicated:

> Concern about the U.S. deficit and the international value of the dollar could lead holders of dollars to undertake reductions in their dollar assets. Exchange market uncertainties would thereby be heightened and instability increased. It is, therefore, necessary to demonstrate our resolve to contain our oil imports and to help avoid the economic disruption that could follow from such portfolio shifts.

See Appendix B—Compilation of Agency Submissions.

Chairman Miller of the Federal Reserve Board has noted the relationship between the exchange value of the dollar and the health of the U.S. economy:

> At current quantity and price levels, imported petroleum is a major factor in the large U.S. trade and current account deficits. This has contributed to the substantial depreciation of the dollar in relation to other major currencies. Such depreciation adds to domestic inflation, fosters higher U.S. interest rates, creates instability in the international financial markets, and threatens further increases in international oil

prices. These in turn foster conditions that could lead to lower domestic economic activity and higher unemployment.

See Appendix B—Compliation of Agency Submissions.

Moreover, the world associates a strong currency with a strong country. The United States' relations with other nations and its ability to exercise leadership in political and military affairs are closely linked to confidence in the dollar.

According to the Department of State:

Our high level of oil import dependence has contributed substantially to a current account deficit that has reduced international confidence in the dollar. This in turn has created difficulties in achieving the maximum degree of international cooperation to further our objective of promoting a stable, balanced recovery of the world economy . . .

See Appendix B—Compilation of Agency Submissions.

2. Conclusion.

A perception of continued inability of the nation to resolve its oil import problem could have significant consequences for the value of its currency and could thus seriously harm the nation's economic welfare. Such a perception, therefore, threatens to impair the national security.

IV. FINDINGS

This investigation has established that

- U.S. dependence on foreign oil has increased since 1975 and there has been no change in the risks of interruption, resulting in a greater threat to the national security than before;
- The monetary repercussions accompanying the growing dependency on imported oil constitute a threat to the national security, even apart from the possibility supply interruptions.

ROBERT H. MUNDHEIM,
General Counsel,
Department of Treasury.

MARCH 14, 1979.

FOOTNOTES

[1] The 1959 finding was announced in Presidential Proclamation 3279, on March 10, 1959, 24 Fed. Reg. 1781 (1959). The 1975 Treasury finding appeared as U.S. Dep't of Treasury, Report on Investigation of Effect of Petroleum Products on the National Security pursuant to Section 232 of the Trade Expansion Act, as amended, 40 Fed. Reg. 4467 (1975).

[2] *See* Presidential Proclamation 3279, 24 Fed. Reg. 1781 (1959) as amended (quotas), modified by Presidential Proclamation 4210, 38 Fed. Reg. 9645 (1973) (license fees). The supplemental license fees imposed by President Ford following the 1975 finding were subsequently revoked.

[3] *FEA* v. *Algonquin SNG Inc.*, 426 U.S. 548 (1976).

[4] President's Special Committee to Investigate Crude Oil Imports, Report to the President, March 6, 1959.

[5] Presidents' Special Committee to Investigate Crude Oil Imports, Report to the President, July 29, 1957.

[6] U.S. Dep't of Treasury, Report, *supra* note 1.

[7] Department of Energy Organization Act, Pub. L. No. 95-91, Sec. 101, 91 Stat. 567 (to be codified at 42 U.S.C. sec. 7112 (1977)).

[8] Emergency Petroleum Allocation Act of 1973, sec. 2, 15 U.S.C. sec. 751 (1973).

[9] National Energy Conservation Policy Act of 1978, Pub. L. No. 95-619, sec. 102, 92 Stat, 3206. (to be codified at 42 U.S.C. 820 (1978)).

[10] 3 [1977] Energy Information Adm. Ann. Rep. to Cong. 23 [hereinafter cited as EIA Annual Report]. Imports for 1975 and 1978 are on balance of payments basis, derived from Bureau of Census statistics and covering imports from foreign countries into U.S. Customs territory plus the Virgin Islands and Guam; data obtained from Balance of Payments Division, Bureau of Economic Analysis, Department of Commerce.

[11] Data from Monthly Energy Review, Feb. 1979, at 30, adjusted to a balance of payments basis.

[12] For 1959, *see* EIA Annual Report, *supra* note at 5, 23. For 19[illegible], *see* Monthly Energy Review, Feb. 1979, at 4, 30, adjusted to a balance of payments basis.

[13] Data by source are from Department of Energy and differ slightly from balance of payments data. For 1978 data, *see* Letter from Deputy Secretary of Energy John O'Leary to Secretary of Treasury W. Michael Blumenthal (March 9, 1979). For 1975 data, *see* Monthly Energy Review, May 1978, at 12, 14. For 1959 data, *see* Independent Petroleum Association of America, United States Petroleum Statistics 1978 (preliminary). The 1959 data are for countries which are not OPEC members Estimated indirect imports for all year have been included.

[14] Monthly Energy Review, Feb. 1979, at 30, adjusted to a balance of payments basis.

[15] Production data based on first 9 months of 1977 and 1978. *See* U.S. Dep't of Energy, Energy Data Reports, Petroleum Statement, Monthly, Sept. 1978, at 7.

[16] American Petroleum Institute, Estimated U.S. Supply/Demand Situation, June 1978, at 2.

[17] U.S. Dep't of the Interior, Energy Perspectives II, June 1976, at 191.

[18] *Id.* at 194.

[19] Canadian National Energy Board, Report, "In the Matter of Exportation of Oil," October 1974, 4-7.

[20] Data are Department of the Treasury estimates, based on information supplied by Department of Energy and the Central Intellignecy Agency. Includes both drect and indirect imports.

[21] An indication of productive capacity can generally be estimated from the proven reserves. It should be noted that the Middle East contains approximately 385 billion barrels of proven crude oil reserves. This is almost 60% of the entire world's reserves. Within the Middle East, Saudi Arabia, Kuwait and Iran have 281 billion barrels. These three countries dwarf the rest of the world in their current reserves. By contrast, the reserves of Indonesia are only 14 billion barrels; Nigeria, 19 billion barrels; and Venezuela, 14 billion barrels. *See* "Estimated Proved and Provable Petroleum reserves," in Central Intellignece Agency, International Energy statistical Review, Feb. 7, 1979 at 4.

[22] Mexican exports to the U.S. constituted 0.3 percent of U.S. oil imports in 1973, about 2 percent in 1977, and are expected to continue to raise in the future. *See* Monthly Energy Review, May 1978, at 12, 14.

[23] Unit value for 1959 is for crude oil only; those for 1975 and 1978 cover crude and products. Data are based on Bureau of Census import statistics, and were obtained from Balance of Payments Divsion, Bureau of Economic Analysis, Department of Commerce.

[24] Balance of Payments basis. Represents Bureau of Census statistics covering imports from foreign countries into U.S. Customs territory plus the Virgin Islands and Guam.

[25] Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and United Arab Emirates.

[26] Energy Policy and Conservation Act, secs. 151-166, 42 U.S.C. secs. 6231-46 (1976).

[27] The Department of Energy's Stategic Petroleum Reserve Plan, amendment no. 2 to increase the size to one billion barrels became effective June 13, 1978.

[28] Agreement on an International Energy Program, Brussels, September 27, 1974, ch. IV.

[29] *See*, e.g., Section 232 Investigation Comment of American Gas Association dated February 21, 1979 (on file at U.S. Dep't of Treasury).

[30] Monthly Energy Review, May 1978, at 38.

[31] *See* EIA Annualy Report, *supra* note 10, at 5.

[32] Monthly Energy Review, Feb. 1979 at 6.

[33] The Administration supported a nuclear siting and licensing bill in Congress which would reduce lead time to 6—7 years. H.R. 11704, 124 Cong. Rec. H. 2,298 (daily ed. March 21, 1978). The Administration anticipates introducing a similar bill in the near future.

[34] Executive Office of the President, National Energy Plan, April 29, 1977, at 95 [hereinafter cited as the NEP].

[35] According to the NEP, nuclear power will equal 24.5 percent of total electricity generated in 1985. NEP, *supra* note 32, at 95. The EIA forecasts 19 percent nuclear power for slightly less electricity generated in 1985. 2 EIA Annual Report, *supra* note 10, at 215.

[36] NEP, *supra* note 35, at 96.

[37] For 1970 data, *see* 3 EIA Annual Report, *supra* note 10, at 23; includes lease condensate. For 1978 data, *see* Monthly Energy Review, Feb. 1979, at 28.

[38] Monthly Energy Review, Feb. 1979, at 76.

[39] 2 EIA Annual Report, *supra* note 10, at 139 (table 6.9).

[40] American Petroleum Institute, Reserves of Crude Oil, Natural Gas Liquids and Natural Gas in the United States and Canada as of Dec. 31, 1977 24 (1978).

[41] 2 EIA Annual Report, *supra* note 10, at 149 (figure 6.3).

[42] 2 EIA Annual Report, *supra* note 10, at 149 (table 6.14).

[43] National Petroleum Council, Enhanced Oil Recovery, Dec. 1976, at 6 (figure 2).

[44] Entitlements essentially average the cost of crude oil to refiners. Higher priced imported oil is averaged in with lower priced, price-controlled domestic oil. The cost to refiners of a composite barrel is approximately $2/bbl. less than the cost of imported oil.

[45] The data in this section were developed by the Office of International Monetary Affairs, Department of Treasury.

APPENDIX A—ORDER INITIATING INVESTIGATION

Memorandum for Robert Mundheim, General Counsel

SUBJECT: REQUEST FOR SECTION 232 INVESTIGATION

MARCH 15, 1978.

Pursuant to my authority under Section 232 of the Trade Expansion Act, 19 U.S.C. section 1862, I request that you immediately initiate an investigation to determine whether imports of petroleum and petroleum products threaten to impair the national security.

Since the investigation is being initiated only for contingency purposes at this time, it should be conducted on a confidential basis by selected persons within the Treasury Department. Other Departments and agencies should be consulted as appropriate in the future.

In my judgment, national security interests require that an opportunity for public comment should not be afforded in this case. Accordingly, I exercise my discretion under section 232, reflected in Treasury Regulations 31 CFR sections 9.7 and 9.8, to proceed without public notice, hearings, or opportunity for comment. Therefore, I request that you dispense with these procedures and proceed immediately with the investigation.

W. MICHAEL BLUMENTHAL.

APPENDIX B—COMPILATION OF AGENCY SUBMISSIONS

INDEX

1. February 12, 1979 submission of Board of Governors of the Federal Reserve System.
2. February 23, 1979 submission of the Central Intelligence Agency.
3. February 26, 1979 submission of the Department of Defense.
4. March 9, 1979 submission of the Department of Energy (including Appendices A through G).
5. February 9, 1979 and April 3, 1978 submission of the Department of State.
6. October 26, 1978 submission of the Department of Transportation.
7. February 12, 1979 revision of September 11, 1978 submission of the Council of Economic Advisers.
8. February 12, 1979 submission of the Department of the Interior.
9. April 24, 1978 submission of the Department of Labor.
10. September 14, 1978 submission of the Department of Commerce.

1

BOARD OF GOVERNORS, OF THE FEDERAL RESERVE SYSTEM

Washington, D.C.
February 12, 1979.

The Honorable W. MICHAEL BLUMENTHAL, *Secretary of the Treasury, Department of the Treasury, Washington, D.C.*

DEAR SECRETARY BLUMENTHAL: In response to your request, the following comments are being submitted on behalf of the Federal Reserve Board to assist in an investigation by the Secretary of the Treasury under Section 232(b) of the Trade Expansion Act of 1962 with respect to U.S. imports of petroleum and petroleum products.

In particular, you have asked for an analysis of the impact of petroleum imports on (1) the domestic economy, including growth, employment and inflation, (2) the U.S. balance of payments and the value of the dollar in foreign exchange markets, and (3) the stability of the domestic and international financial system generally.

General Discussion

(1) Prior experience indicates the adverse effects on the U.S. economy of excessive reliance on foreign sources for the oil upon which our economy critically depends. In a matter of months, the 1973-74 oil embargo disrupted the world economy with serious direct and indirect repercussions on U.S. economic activity, production and employment. The current disruption of Iranian production and exports of oil has once again illustrated our vulnerability. The continuing risk of supply interruption is a serious threat to the U.S. economy and thus to U.S. national security. The U.S. program for stockpiling oil, while providing some short-term protection, would not eliminate this risk.

(2) International petroleum prices, which are set in terms of U.S. dollars, are now at a level more than six times that prevailing in mid-1973. Further price increases have already occurred in 1979 and additional substantial price increases are scheduled for later in the year. These increases could well be larger if oil supplies from Iran remain sharply curtailed.

(3) Increases in the price of imported petroleum—an essential commodity in the U.S. economy—have contributed directly and indirectly to inflationary pressures in the United States. High or accelerating rates of inflation can lead to a slackening in economic activity through adverse effects on real personal income, expectations and markets. These effects can pose a threat to economic stability.

(4) Even at current prices, oil imports have been a substantial factor contributing to the emergence of a very large U.S. trade deficit. The U.S. oil import bill is now running at an annual rate of over $40 billion, up from $8½ billion in 1973; oil imports now constitute one-quarter of the dollar value of U.S. imports. The trade balance, meanwhile, has moved from an approximate balance in 1973 to a deficit of almost $35 billion in 1978. Although the trade deficit was reduced in the last three quarters of 1978, and a significant further improvement is in prospect for 1979, the trade deficit will remain large.

(5) Large U.S. trade deficits have contributed to an environment in which the dollar depreciated in 1978 by over 10 per cent against major foreign currencies in often disorderly trading conditions. This decline in the foreign exchange value of the dollar has increased uncertainty in world financial markets and inhibited the development of conditions conducive to world economic growth. If severly unsettled exchange market conditions were to reemerge, the risk is increased of potential capital outflows that would exert additional downward pressure on the dollar, with it associated inflationary implications. The depreciation of the dollar from mid-1977 through most of 1978 added about 1 per cent to U.S. price inflation last year, and the lagged effects of the depreciation will add further to our inflation problem in 1979 and 1980. Moreover, the depreciation of the dollar was apparently a consideration influencing OPEC to schedule substantial price increases for 1979. The November 1 actions have helped to correct the excessive decline in the dollar's international value and to restore a measure of stability to exchange markets. Fundamental corrective steps must continue to be pursued to deal effectively with those conditions that have depressed the dollar. Reduction in U.S. dependence on imported oil represents one such fundamental corrective step.

(6) The U.S. dollar plays a major world role as a reserve asset and as a medium for investments and other transactions. Concern about the U.S. deficit and the international value of the dollar could lead holders of dollars to undertake reductions in their dollar assets. Exchange market uncertainties would thereby by heightened and instability increased. It is, therefore, necessary to demonstrate our resolve to contain our oil imports and to help avoid the economic disruption that could follow from such portfolio shifts.

(7) Large U.S. current-account deficits not only contribute to downward pressure on the dollar but also create economic uncertainties and expectations of future declines in the value of

the dollar. The present situation has fostered protectionist pressures both here and aboard. The rest of the world is looking to the United States to limit its demand for petroleum. If we fail to do so, U.S. credibility and leadership will be weakened with adverse implications for our foreign policy.

Conclusion

An adequate and secure supply of petroleum and petroleum products is critical to the functioning of the U.S. economy now and in the foreseeable future. The United States is currently heavily dependent upon imports in order to fulfill that critical need, and such dependence threatens to impair our national security because:

(a) Even at current quantity and price levels, imported petroleum is a major factor in the large U.S. trade and current account deficits. This has contributed to the substantial depreciation of the dollar in relation to other major currencies. Such depreciation adds to domestic inflation, fosters higher U.S. interest rates, creates instability in the international financial markets, and threatens further increases in international oil prices. These in turn, foster conditions that could lead to lower domestic economic activity and higher unemployment.

(b) Requirements for higher quantities of oil or imposition of higher oil prices will aggravate these adverse conditions.

(c) An embargo of the type experienced in 1973-74, or a similar interruption in the supply of imported oil, would adversely affect the U.S. economy.

(d) The November 1 actions to correct the excessive depreciation of the dollar have had beneficial effects, but continuing corrective steps are necessary to ensure the dollar's stability.

All this indicates the need to reduce the U.S. dependence on imported petroleum and petroleum products. Please let me know if you desire further data or analysis.

Sincerely,

G. WILLIAM MILLER,
Chairman.

2

CENTRAL INTELLIGENCE AGENCY

WASHINGTON, D.C.,
February 23, 1979.

The Honorable ROBERT H. MUNDHEIM,
General Counsel,
Department of the Treasury,
Washington, D.C.

DEAR MR. MUNDHEIM: In response to your letter of 6 February 1979, relating to the investigation of US imports of petroleum and petroleum products under Section 232 of the Trade Expansion Act, we are forwarding an update of the analysis we provided you on 16 May 1978 addressing the impact of oil imports on national security.

We stand by our previous conclusion that the economy of the United States is critically dependent on oil imports. Imports of crude oil and petroleum products accounted for 42 percent of US oil consumption during the first half of 1978. Total imports for the year are estimated at 8.2 million b/d, 44 percent of consumption. This dependence is expected to increase further in the years ahead as Alaskan oil production levels off and output in the lower 48 states continues its downward trend.

As you requested we have also included a brief unclassified assessment of the current Iranian situation for your use. Although Iran provided only 5 percent of US oil consumption during the first half of last year, the recent disruption in Iranian oil supplies clearly points up the vulnerability of the US economy to supply disruption. We have also enclosed an update of the table provided earlier indicating the major countries exporting oil to the United States. The data in the table includes both direct and indirect US oil imports.

Yours,

FRANK C. CARLUCCI
Director.

Enclosure:
As stated.

Section 232 Investigation on Petroleum Inports

In 1978 the United States imported 8.2 million b/d—44 percent of total oil consumption. During first-half 1978, the latest six-month period for which country data are available, more than 40 percent of US direct and indirect oil imports originated in Arab countries. In 1970 the US was dependent on oil imports for only 22 percent of oil consumption and only 11 percent of the oil imports originated in Arab countries.

As demonstrated by recent events in Iran, oil supply interruptions can emerge from political upheavals among the governments of major oil producers in the Persian Gulf. The probability that another oil exporter may suddenly undergo an unsettling change in the next several years is hard to assess. But, should a political discontinuity occur, one possible consequence would be a reduction, for an indeterminate period of time, in oil output. The underlying motivations of the new leadership in such a contingency could range from the desire to conserve resources, to the desire to pressure importers to act on some issue of interest to the oil exporter.

Accidents and Terrorist or Guerrilla Action

There is a high probability that acts of nature, human error, or deliberately targeted terrorist attack will interrupt the flow of oil in one or more of the oil exporting nations during the next several years.

Interruptions of oil supply owing to guerrilla operations, acts of terrorism, or acts of nature are not likely, by themselves, to be of a magnitude and duration which would result in severe economic disruption of Free World economies, though they could exert strong upward pressure on prices in a tight world oil market. Extensive terrorist action against key oil storage and transportation facilities in the Persian Gulf could, in particular, significantly affect the market by substantially reducing oil supplies for the time required to put those facilities back into operation, which could be several months.

Regional War

Recent history provides many examples of practical cooperation among the states of the Persian Gulf, but there are a number of regional territorial and political disputes involving Middle Eastern oil exporting nations that could escalate to armed conflict, including insurrections, guerrilla wars, and more conventional international wars. The concentration and physical vulnerability of production and transportation facilities in the area are so high that some damage to facilities is likely to occur, resulting in a decline in oil production in the area of hostilities. In the principal Middle Eastern oil producing nations a reduction of production by one-fourth would have a significant impact on the dependent Free World within three months or so.

Communist Countries

At present, the USSR and China do not have the US vulnerability to oil supply interruption. Both countries are net exporters of petroleum. In 1977, the USSR exported more than 3 million b/d, almost half to non-Communist countries. China exported about 200,000 b/d in 1977.

The Iranian Situation

The interruption of Iranian oil production and exports has demonstrated the vulnerability of oil consumers to disruptions in the oil exporting nations. Iran has produced less than 1 million b/d since late December 1978, instead of the 5-6 million b/d that would have been expected under normal circumstances. The shortfall has been only partially offset by other producers. Saudi Arabia is averaging about 1 million b/d more than would have been expected, and other OPEC

producers are producing about 1 million b/d above the level anticipated.

Spot market prices have climbed sharply during the prolonged cutoff in Iranian oil supply, prompting several OPEC members to increase their selling prices over and above the increase in 1979 oil prices already scheduled. Many OPEC countries are selling increasing quantities of crude at spot prices; Saudi Arabia is selling part of its production at fourth quarter 1979 prices.

Unless substantial Iranian oil production and exports are restored or Free World oil consumption is restrained, severe market pressures could arise as early as second quarter 1979, and the situation could become critical by the winter of 1979/80. Companies will probably hold on to their stocks—many; including those with relatively little dependence on Iran, have already cut back their deliveries substantially—forcing an adjustment in consumption. This process would include higher prices as well as informal rationing by the companies. Government conservation measures would probably also be required.

We expect a tight oil situation to continue for the next several years. The new Iranian leadership, apparently intending to pursue a more moderate development strategy than the Shah's regime, probably will produce less oil than in the past. It will also support OPEC oil price hikes, adding to the bargaining strength of the OPEC hawks. Rising prices, of course, will restrain oil consumption, but at the cost of reduced economic growth.

Direct and Indirect US Oil Imports by Source

(Thousand b/d)

	1975	% Total	1977	% Total	Jan-Jun 1978[1]	% Total
Algeria	290	4.8	565	6.5	684	8.7
Iraq	10	0.2	105	1.2	NA	NA
Kuwait	30	0.5	60	0.7	NA	NA
Libya	330	5.5	845	9.7	707	8.9
Qatar	90	1.5	100	1.1	NA	NA
Saudi Arabia	850	14.1	1,545	17.7	1,220	15.4
United Arab Emirates	170	2.8	430	4.9	478	6.0
Arab Members of OPEC	1,770	29.4	3,650	41.8	3,257	41.2
Ecuador	70	1.2	65	0.7	NA	NA
Gabon	--	--	55	0.6	NA	NA
Indonesia	450	7.5	615	7.0	575	7.3
Iran	500	8.3	815	9.3	920	11.6
Nigeria	820	13.6	1,255	14.4	903	11.4
Venezuela	1,040	17.2	895	10.2	872	11.0
OPEC	3,810	63.2	7,350	84.1	6,639	83.9
Canada	800	13.3	460	5.3	463	5.8
Mexico	--	--	180	2.1	244	3.1
Others	580	9.6	750	8.6	NA	NA
TOTAL	6,030	100.0	8,740	100.0	7,912[2]	100.0

1. Estimated. Imports for strategic petroleum reserve included in total but not in data for individual countries.
2. The decline in imports is due primarily to increased availability of Alaskan oil during first half 1978. Imports for the entire year are estimated at 8.2 million b/d, but data are unavailable by source.

18897

3

ASSISTANT SECRETARY OF DEFENSE,

Washington, D.C. 20301,
February 26, 1979.

Hon. ROBERT H. MUNDHEIM,
General Counsel, Department of Treasury, Washington, D.C.

DEAR MR. MUNDHEIM: This is in response to your February 6, 1979, letter which requested Department of Defense comments on the impact of oil imports on the national security of the United States. You requested our comments in connection with an investigation you are conducting pursuant to Section 232(b) of the Trade Expansion Act of 1962. This letter confirms the conclusions stated in our classified report to you on this subject on September 12, 1978.

The Department of Defense concludes that imports of petroleum in current quantities make us vulnerable to energy supply disruptions. Such disruptions could threaten the national security of the United States. We base this conclusion on analysis of two aspects of the national security: the potential domestic effects of disruption of normal levels of petroleum imports, and the way in which foreign governments, when making decisions on foreign affairs and defense matters, perceive the United States' dependence on oil imports. These analyses are summarized below.

I. *Potential Domestic Effect on Defense Capability Due to Disruption of Normal Levels of Petroleum Imports*

We evaluated two separate factors: first, the risk that there will be a disruption; and second, the domestic effects that will ensue if there is a disruption.

A. *Risk of disruption*

The Department of Defense has analyzed the risk of disruption. We are following closely the impact of the various situations in the Middle East on the nation's petroleum supply. The concentration of oil production facilities in the area presents the major physical risk. This creates a risk of interdiction, or even the risk of natural or accidental disturbances. The extensive damage in the Abqaiq fires in May and June 1977, caused by accident, highlights the fragility of these facilities. Destruction of key facilities could cause major interruptions of oil deliveries to the U.S. and to our NATO and Japanese allies which would adversely affect U.S. and Western World political, economic and military security.

Many ideological disputes in the Middle East have the potential to escalate to armed conflict in a single country, on a regional scale, within the Middle East, or could draw in powers outside the Middle East. Also, various terrorist groups operate in the Middle East with the capability to mount an attack on oil production or transportation facilities. We estimate that resumption of production and distribution of oil following such an attack could require six months to a year. The time required could be even longer depending on the availability of specialized personnel and repair equipment and the extent of the destruction.

B. *Defense-related results of disruption*

A disruption which threatens the supply of fuel to the military has profound implications. Secretary of Defense Harold Brown has summarized the problem succinctly.

"The present deficiency of assured energy resources is the single surest threat that the future poses to our security and to that of our allies. . . . Such a cut-off could grow from conflict between others—as in the Middle East in a crisis which did not involve our own forces; or it could be directed primarily at the United States—as in a war in which our adversary interdicted or destroyed our sources of foreign supply. Under either condition, until we lessen the import habit we are terribly vulnerable."

Disruption of petroleum imports has a direct impact on the economic and political security of the United States. The impact could include the lack of adequate fuel to operate industries, increased inflation and, ultimately, rising unemployment. Impacts such as these affect the military security, because they weaken one of this country's greatest assets, its industrial vitality. The Department of Defense relies on the industrial base to provide the weapons and equipment it needs to project its military power when and where needed to protect the national interests of the United States. As a result, adverse economic conditions in the United States weaken the industrial base. Reduction of oil supplies could cause some contractors, upon whom the Department of Defense relies, to curtail operations altogether. Other contractors could be forced to limit their operations (e.g., close some plants) in a way that would make them less flexible and responsive to Department of Defense requirements.

Preoccupation with domestic economic problems could result from a petroleum import disruption. This preoccupation could cause us as a nation to emphasize a solution to the domestic economic dislocation at hand at the expense of longer term international interests.

II. *Potential Effect on Perceptions of Other Countries*

The threatened impairment of the national security must be assessed not only in terms of the domestic capability to support national defense needs as we discussed above, but also in terms of international perceptions. Other countries make decisions on foreign relations and defense matters based upon their perception of our strengths. The impact of petroleum import restrictions on the United States could alter these perceptions significantly causing them to misjudge U.S. intentions. Such decisions would affect directly the security of the United States.

A. *Allied and uncommitted nations*

The substantial dependence of the United States on imported oil may strain security arrangements with allies and may make productive relations with uncommitted nations about defense matters more difficult. Included here is the perception on the part of a foreign government that the United States may be unable to meet its international defense commitments.

B. *Hostile nations*

The national security also is affected by how hostile nations perceive our resolve and ability to respond effectively to challenges. Decisions of hostile nations which could entail intervention in the affairs of or aggressive acts toward other nations will depend as often on our economic health and the will of our people as on our military capabilities. Other nations' perceptions of these factors, as well as the objective facts, are critical to the national security.

The concerns of the Department of Defense, as expressed above, are reinforced by recent developments. The reality of the current problem in Iran underscores the potential dangers that our reliance on petroleum imports has.

If I can be of further help, please let me know.

Sincerely,

ROBERT B. PIRIE, Jr.,
Principal Deputy Assistant Secretary of Defense (MRAEL).

4

MARCH 9, 1979.

Hon. W. MICHAEL BLUMENTHAL, *Secretary of the Treasury, Fifteenth Street & Pennsylvania Avenue NW., Washington, D.C.*

DEAR MR. SECRETARY: This letter is in response to your request of April 4, 1978, for information which would assist you in determining, pursuant to Section 232(b) of the Trade Expansion Act of 1962, as amended, whether petroleum and petroleum products are being imported into the United States in such quantities or under such circumstances as to threaten to impair the national security. The specific information which you requested is contained in the appendices accompanying this letter.

In addition, I have included an appendix which compares the data chiefly relied upon during the 1975 investigation of petroleum imports [1] with current data. That comparison reveals that the United States has become even more dependent on foreign sources of oil which are subject to the threat of interruption than in 1975 when the conclusion was reached that petroleum and petroleum products were being imported "in such quantities and under such circumstances as to threaten to impair the national security." [2]

In the intervening period the United States has not fully achieved a capability to avoid the serious consequences to the national security which would result from a significant interruption in imports of petroleum. The Department of Energy adopted an Interim Response Plan for Petroleum Contingencies in June 1978 which addresses the use and interrelationship of the three primary classes of options the DOE currently has for mitigating the effects of a petroleum import interruption. Those options are:

(1) *Drawdown of the Strategic Petroleum Reserve*—In June 1978 the Congress approved DOE-proposed changes [3] to the SPR Plan which authorized expansion of the Reserve to one billion barrels from the previous target of 500 million barrels. DOE expects that the initial target of 248 million barrels in SPR storage will be met by the end of 1980. In view of the Iranian situation, however, it is uncertain whether the current objective of acquiring 10 million barrels a month for the SPR can be maintained. As of February 11, 1979 approximately 77 million barrels had been delivered to the SPR (See Appendix C). Other than the limited quantity which has been placed in SPR storage, emergency supply availability is limited to current inventories, domestic and international stocks, and exports from countries which decline to participate in a possible future embargo. Those stocks are currently being drawn down due to the cessation of Iranian exports which further limits our flexibility to withstand any additional interruption in our supply.

(2) *Regulatory Demand Reduction and Supply Management*—Current regulatory measures for emergencies have been revised and are in the final development process. These include crude and product allocation and pricing regulations, and rationing and contingency plans (See Appendix B).

(3) *International Energy Program*—In the event of an international supply disruption, the International Energy Program (IEP) is designed to coordinate a collective response of most of the major oil importing countries, including the United States. This could ease to some degree the effects of an embargo directed against a single member. In the event of a general embargo the IEP would tend to equalize the disruption in its members' imported supplies and minimize competition for the available supplies. Proposed regulations to allow the Secretary of Energy to require U.S. oil companies to allocate petroleum internationally in order to carry out U.S. obligations under Chapters III and IV of the IEP Agreement were published in February of 1978 and a public hearing was held in June of 1978. Final regulations are in the process of being reviewed internally and will be published shortly.

Recent events in the Middle East have underscored our vulnerability and mandate that the President retain authority to adjust imports in a manner consistent with current conditions. Therefore, the conclusion that petroleum and petroleum products were being imported "in such quantities and under such circumstances as to threaten to impair the national security", reached by the 1975 national security investigation conducted by the Department of the Treasury, clearly remains an accurate and valid one.

Sincerely,

JOHN F. O'LEARY,
Deputy Secretary.

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[1] Report of Investigation of Effect of Petroleum Imports and Petroleum Products on the National Security Pursuant to Section 232 of the Trade Expansion Act, as amended, Department of the Treasury; January 13, 1975 (Report).

[2] *Id.* at 1.

[3] Strategic Petroleum Reserve Plan—Expansion of the Strategic Petroleum Reserve—Amendment No. 2; Energy Action DOE No. 1; March 1978.

APPENDIX A

Statistics Relating to National Energy Supply and Demand

Attachment

Demand and Consumption

1978	Total Energy Consumption		77,672	Quads
1978	Total Domestic Demand		18,707	m b/d
	Refined Products			Quads

Supply

1978	Domestic Crude Oil Production		8,671	m b/d
1978	North Slope Crude Oil Production		1.15-1.2	m b/d Estimate
1978	Imports - Crude oil		6,064	m b/d
	Refined Products		1,958	m b/d
1978	Imports (Direct and Indirect)	Indirect	Direct	
	from 1) OPEC Nations	1,235.1	5,575.5	m b/d
	2) OAPEC Nations	469.6	2,884.6	m b/d
		Jan-May	Jan-Nov	
1978	Average Estimated Landed Price Saudi Arabian crude		$ 14.88 Jan-Nov	/bbl
1978	Electricity produced by Nuclear Power		3,012	Quads
1978	Petroleum consumed to Produce Electricity		577,677 Jan-Nov	Jan-Oct thousands of barrels
	U.S. Crude Oil Reserves - end 1977		29,486	billion bbls
	New Reserves Added during 1977			
	NGL		300	million bbls
	Crude Oil		1,400	million bbls

Strategic Petroleum Reserves (please verify accuracy)

Inventory in place end 1978	correct	68.5 333,000	million bbls
Estimated goal for fill rate for 1979			b/d
Estimate date for goals of			
500 million bbls in place	correct	1983	
750 million bbls in place	correct	1986	
1 billion bbls in place			

Although DOE has authority to establish a 1 billion bbls reserve by 1985, specific implementation plans have not been formulated nor have funding decisions been made as of this date.

Executive Summary (Continued)

Domestic Energy Production by Primary Energy Type

		Coal[1]	Crude Oil[2]	NGPL[3]	Natural Gas (dry)	Hydro-electric Power[4]	Nuclear Electric Power	Geothermal Power and Other[5]	Total
		Quadrillion (10^{15}) Btu							
1972	TOTAL	14.590	20.041	2.578	22.206	2.884	0.577	0.839	62.805
1973	TOTAL	14.381	19.483	2.566	22.187	2.661	0.830	0.850	62.421
1974	TOTAL	14.487	18.575	2.479	21.211	3.177	1.215	0.859	61.203
1975	TOTAL	15.201	17.729	2.382	19.841	3.155	1.839	0.875	60.022
1976	January	1.230	1.480	0.197	1.709	0.274	0.172	0.008	5.069
	February	1.256	1.385	0.191	1.609	0.258	0.153	0.007	4.858
	March	1.424	1.460	0.201	1.674	0.280	0.149	0.008	5.194
	April	1.382	1.406	0.194	1.585	0.254	0.117	0.007	4.946
	May	1.355	1.469	0.197	1.634	0.269	0.127	0.007	5.057
	June	1.397	1.417	0.193	1.601	0.269	0.168	0.007	5.052
	July	1.038	1.457	0.198	1.636	0.274	0.189	0.007	4.799
	August	1.256	1.465	0.198	1.597	0.251	0.196	0.007	4.971
	September	1.417	1.418	0.193	1.528	0.214	0.184	0.007	4.961
	October	1.376	1.450	0.199	1.600	0.222	0.185	0.007	5.038
	November	1.373	1.406	0.195	1.596	0.209	0.172	0.006	4.957
	December	1.364	1.450	0.197	1.711	0.213	0.225	0.007	5.167
	TOTAL	15.870	17.262	2.358	19.480	2.996	2.037	0.084	60.088
1977	January	1.030	1.401	0.189	1.700	0.218	0.236	0.008	4.782
	February	1.134	1.310	0.175	1.636	0.161	0.209	0.007	4.632
	March	1.537	1.442	0.206	1.710	0.209	0.220	0.008	5.333
	April	1.393	1.406	0.196	1.606	0.197	0.212	0.007	5.017
	May	1.439	1.440	0.198	1.653	0.198	0.220	0.007	5.154
	June	1.453	1.399	0.191	1.610	0.182	0.229	0.007	5.072
	July	1.142	1.446	0.196	1.636	0.178	0.233	0.007	4.837
	August	1.334	1.482	0.194	1.607	0.177	0.243	0.007	5.043
	September	1.599	1.464	0.187	1.561	0.174	0.209	0.007	5.202
	October	1.558	1.530	0.199	1.591	0.182	0.203	0.008	5.270
	November	1.589	1.481	0.192	1.569	0.216	0.207	0.008	5.262
	December	0.719	1.514	0.199	1.667	0.240	0.253	0.007	4.621
	TOTAL	15.926	17.315	2.323	19.665	2.331	2.674	0.088	60.223
1978	January	0.540	1.501	0.190	1.707	0.264	0.276	0.008	4.485
	February	0.547	1.360	0.172	1.588	0.236	0.233	0.007	4.142
	March	R0.901	1.583	0.194	R1.679	0.260	0.239	0.006	R4.862
	April	R1.376	1.515	0.191	1.604	R0.266	0.187	R0.005	R5.145
	May	R1.588	R1.582	0.187	1.597	R0.302	0.218	0.004	R5.478
	June	R1.518	1.535	0.187	1.561	R0.265	0.236	0.005	R5.308
	July	R1.242	1.573	0.190	1.633	R0.257	0.267	0.005	R5.167
	August	R1.489	R1.580	0.190	1.590	R0.233	0.273	0.007	R5.361
	September	R1.338	††1.493	††0.186	R1.508	R0.223	R0.237	0.007	††4.991
	October	R1.616	††1.553	††0.191	††1.552	R0.206	0.245	0.006	††5.368
	November	1.600	††1.493	††0.185	††1.562	0.211	0.265	0.006	††5.322
	December	1.379	††1.590	††0.191	††1.674	††0.225	††0.336	††0.006	††5.401
	TOTAL	15.136	18.357	2.253	19.254	2.949	3.012	0.071	61.031

[1] Includes bituminous coal, lignite and anthracite coal
[2] Includes lease condensate
[3] Natural gas plant liquids
[4] Includes industrial and utility production of hydropower
[5] Other includes wood, refuse, and other vegetal fuels used for electricity generation
†Preliminary data.
††Estimated data.
R=Revised data
Note: Totals may not equal sum of components due to independent rounding
Source: EIA calculations based on data reported elsewhere in this publication

Executive Summary (Continued)

Domestic Energy Summary

		Domestic Energy Production[1]	Domestic Energy Consumption[2]	Energy Imports[3]	Energy Exports[4]
		Quadrillion (10^{15}) Btu			
1972	TOTAL	62.905	71.843	11.503	2.134
1973	TOTAL	62.421	74.620	14.726	2.071
1974	TOTAL	61.203	72.736	14.396	2.245
1975	TOTAL	60.022	70.678	14.079	2.387
1976	January	5.069	7.189	1.317	0.136
	February	4.858	6.268	1.235	0.132
	March	5.194	6.262	1.310	0.151
	April	4.946	5.731	1.258	0.207
	May	5.057	5.665	1.242	0.197
	June	5.050	5.697	1.404	0.226
	July	4.799	5.891	1.516	0.187
	August	4.971	5.836	1.434	0.168
	September	4.961	5.613	1.481	0.201
	October	5.036	6.124	1.472	0.244
	November	4.957	6.627	1.513	0.218
	December	5.167	7.524	1.632	0.183
	TOTAL	60.069	74.413	16.615	2.210
1977	January	4.780	7.710	1.715	0.102
	February	4.634	6.530	1.737	0.130
	March	5.333	6.452	1.793	0.139
	April	5.017	5.855	1.626	0.209
	May	5.154	5.856	1.658	0.215
	June	5.072	5.945	1.651	0.214
	July	4.837	6.054	1.732	0.195
	August	5.043	6.151	1.654	0.169
	September	5.202	5.941	1.603	0.197
	October	5.270	6.144	1.567	0.182
	November	5.252	6.362	1.523	0.175
	December	4.621	7.314	1.610	0.164
	TOTAL	60.223	76.299	19.884	2.088
1978	January	4.485	R7.590	1.565	0.079
	February	4.142	R6.912	1.397	0.056
	March	R4.862	R6.797	1.618	0.064
	April	R5.145	R5.989	1.420	0.135
	May	R5.478	R6.138	1.425	0.185
	June	R5.308	R5.977	1.475	0.225
	July	R5.167	R6.160	1.554	0.165
	August	R5.361	R6.296	†R1.552	R0.179
	September	†R4.991	R5.916	†1.631	†R0.174
	October	†5.368	R6.192	†1.561	†R0.216
	November	†5.322	6.491	†1.577	†0.242
	December	††5.401	††7.213	††1.733	††0.221
	TOTAL	61.631	77.672	18.600	1.945

[1]See Explanatory Note 1
[2]See Explanatory Note 2
[3]See Explanatory Note 3
[4]See Explanatory Note 4
†Preliminary data
††Estimated data
R=Revised data
Source: Energy Information Administration (EIA) calculations based on data appearing elsewhere in this publication

Crude Oil

		Crude Input to Refineries	Domestic Production[1]	Crude Oil Imports[1,2]	Strategic Petroleum Reserve (SPR) Imports	Exports	Crude Oil Stocks[1,3]	Strategic Petroleum Reserve (SPR) Stocks
		Thousands of barrels per day					Thousands of barrels	
1972	AVERAGE	11,896	9,441	2,216		1	246,336	
1973	AVERAGE	12,431	9,208	3,244		2	242,478	
1974	AVERAGE	12,133	8,774	3,477		3	265,020	
1975	AVERAGE	12,442	8,375	4,105		6	271,354	
1976	January	12,560	8,232	4,594		0	289 296	
	February	12 834	8 231	4,206		0	277 414	
	March	12,877	8 232	4 738		1	283 112	
	April	12 727	8 077	4 790		0	286 628	
	May	12 920	8 125	4 669		0	283 982	
	June	13 796	8 094	5 628		0	281 715	
	July	13 901	8 127	5 792		0	282 599	
	August	13 862	8 111	5,556		12	277 272	
	September	13,716	8 150	5 675		0	284 357	
	October	13 319	8 063	5 685		18	297 683	
	November	14 107	8 080	5 968		30	296 836	
	December	14 333	8 061	5 925		34	285 471	
	AVERAGE	13 416	8 132	5,098		8		
1977	January	14 140	7 790	5,288		13	294 037	
	February	14 740	8 067	5 652		59	291 387	
	March	14 270	8 022	5 673		32	296 464	
	April	14 184	8 079	5 785		17	318 586	
	May	14 605	8,009	6 801		89	328 559	
	June	14,860	8 039	5 997		10	333 635	
	July	14 884	8 040	7 021		53	335 193	
	August	14 645	8 244	5 416		37	336 300	
	September	14,930	8 416	5 429		91	334 180	
	October	14 658	8 508	6 270	93	38	340 517	2 646
	November	14 636	8 513	5 230	73	45	345 098	5 084
	December	14 745	8 423	6,049	79	69	339 813	7,826
	AVERAGE	14,608	8,179	6,648	21	50		
1978	January	14 139	8 347	5 974	114	98	340 082	11 106
	February	13 959	8,373	5 551	109	8	335 794	14 276
	March	14 141	8 807	5,981	132	60	345 333	18 437
	April	13 872	8 708	5 331	108	92	343 201	21 826
	May	14 982	8 801	6 452	133	124	329 020	25 629
	June	14 685	8 822	6,227	146	195	333 247	30 140
	July	14 903	8 747	6 036	154	138	332 691	35 248
	August	R15 176	R8 788	R6 118	184	175	R316 730	40 958
	September	15 124	8 578	6,659	225	NA	311 703	47 090
	October	15 069	8 636	6 249	195	NA	315 958	53 113
	November	R15 356	R8 578	R6 342	188	NA	R314 223	59 312
	December	15,234	8 841	6,805	NA	NA	312,925	
	AVERAGE	14,726	8,671	6,064	154	112		

[1]See Definitions
[2]Excludes SPR imports
[3]Excludes SPR stocks
‡Total as of December 31
R=Revised data
NA=Not available
Sources: 1972 through 1976: Bureau of Mines (BOM) *Mineral Industry Surveys*, "Petroleum Statement, Annual," January 1977 through April 1977: Bureau of Mines, *Mineral Industry Surveys*, "Petroleum Statement, Monthly," May 1977 through August 1978: Energy Information Administration (EIA) *Energy Data Reports*, "Petroleum Statement, Monthly," September 1978 through November 1978: EIA "Monthly Petroleum Statistics Report." December 1978 data are EIA estimates based on data from the American Petroleum Institute (API), "Weekly Statistical Bulletin."

Total Refined Petroleum Products

		Domestic Demand	Imports[1]	Exports
		Thousands of barrels per day		
1972	AVERAGE	16,367	2,525	222
1973	AVERAGE	17,308	3,012	229
1974	AVERAGE	16,653	2,635	218
1975	AVERAGE	16,322	1,951	204
1976	AVERAGE	17,461	2,026	215
1977	January	20,481	2,594	179
	February	20,427	3,276	175
	March	18,056	2,610	175
	April	17,570	1,886	207
	May	16,960	1,753	199
	June	18,048	1,872	215
	July	17,549	2,021	201
	August	18,009	2,175	193
	September	17,733	2,136	203
	October	17,831	1,862	170
	November	18,440	1,814	190
	December	20,046	2,183	206
	AVERAGE	18,418	2,176	193
1978	January	19,691	2,065	158
	February	20,874	2,497	200
	March	19,[illegible]	2,303	209
	April	17,714	2,100	245
	May	18,133	1,762	189
	June	18,271	1,624	204
	July	17,631	1,946	192
	August	R18,615	R1,850	229
	September	17,867	2,024	NA
	October	18,207	1,759	NA
	November	R18,677	R2,065	NA
	December	19,039	2,118	NA
	AVERAGE	18,707	1,988	203

Total Petroleum Imports (Crude Oil and Refined Products)

	Total Imports (Excluding SPR)	SPR Imports	Total Imports (Including SPR)
	Thousands of barrels per day		
1972 AVERAGE	4,741		
1973 AVERAGE	6,256		
1974 AVERAGE	6,112		
1975 AVERAGE	6,056		
1976 AVERAGE	7,313		
1977 January	8,882		
February	9,930		
March	9,743		
April	8,671		
May	8,574		
June	8,869		
July	9,042		
August	8,591		
September	8,565		
October	8,132	93	8,225
November	8,044	73	8,117
December	8,232	79	8,311
AVERAGE	8,724	21	8,744
1978 January	8,040	114	8,154
February	7,687	109	7,996
March	8,304	132	8,436
April	7,431	108	7,539
May	7,215	133	7,348
June	7,851	146	7,997
July	7,944	154	8,138
August	R8,965	R184	R9,152
September	8,693	225	8,908
October	7,968	195	8,163
November	R8,353	186	8,539
December	8,923	NA	NA
AVERAGE	8,051	154	8,124

Domestic Petroleum Imports from OPEC Countries

	Algeria	Indonesia	Iran	Libya	Nigeria	Saudi Arabia	United Arab Emirates	Venezuela	Other OPEC[1]	Total OPEC	Arab Members of OPEC
	Thousands of barrels per day										
1973	134.2	212.7	222.7	184.3	458.9	487.3	70.6	1,124.7	106.5	2,901.9	914.4
1974	190.2	300.1	468.8	4.4	687.6	460.6	70.5	979.3	88.3	3,250.8	748.5
1975	281.5	308.4	280.4	232.0	781.5	715.0	118.7	897.6	116.1	3,589.2	1,381.3
1976	428.3	537.4	296.5	453.3	1,025.2	1,229.8	255.2	890.2	134.0	5,890.9	2,421.0
1977											
January	493.0	619.2	396.8	827.0	1,285.8	1,328.0	319.5	841.8	324.2	6,236.0	3,000.0
February	666.1	570.3	412.4	638.0	1,265.1	1,441.8	316.7	920.6	241.0	6,472.0	3,141.1
March	459.8	667.0	735.0	701.2	1,300.0	1,371.6	369.5	864.3	184.3	6,352.7	3,022.1
April	866.7	523.9	517.2	782.9	1,242.4	1,437.4	323.5	663.3	250.5	6,401.8	3,363.2
May	392.8	612.7	539.3	784.1	1,072.3	1,724.1	237.1	534.4	435.9	6,232.7	3,451.3
June	435.6	671.6	553.0	827.1	1,190.8	1,432.7	438.6	666.7	343.5	6,562.6	3,374.1
July	673.9	619.0	857.3	763.4	1,194.7	1,369.8	286.1	652.8	350.8	6,567.8	3,232.*
August	837.2	552.8	500.1	640.0	960.5	1,449.4	308.6	744.4	276.9	6,064.9	3,169.8
September	550.8	391.0	448.9	679.2	1,084.8	1,487.4	348.4	744.8	201.0	5,936.3	3,215.1
October	626.2	461.0	413.0	690.5	1,104.2	1,303.3	246.9	586.7	272.0	5,703.9	2,998.1
November	696.6	514.6	422.7	840.1	943.0	1,119.2	420.1	615.1	285.0	5,650.4	3,162.5
December	553.0	492.7	549.0	604.4	987.2	1,064.8	390.5	724.2	289.1	5,654.9	2,835.4
TOTAL	852.0	532.8	530.2	714.7	1,135.1	1,377.0	333.4	6870	288.3	6,150.5	3,182.7
1978											
January	682.3	462.7	681.5	559.9	822.9	1,198.2	348.7	628.4	227.9	5,612.5	2,925.1
February	635.9	393.5	526.2	575.8	756.4	982.4	485.8	750.5	242.3	5,350.8	2,792.3
March	709.5	579.4	547.3	585.9	944.8	1,125.6	296.2	893.6	240.6	5,926.9	2,934.0
April	597.6	504.7	408.6	601.8	584.3	986.6	435.0	641.9	220.2	4,980.7	2,734.1
May	667.1	508.5	730.4	498.7	750.2	786.3	404.5	527.6	84.5	4,967.8	2,396.8
June	756.6	637.1	508.5	630.3	851.7	1,111.3	342.7	481.1	235.4	5,554.7	3,004.8
July	668.5	617.8	532.5	622.2	843.0	1,028.6	289.4	531.9	286.9	5,517.0	2,784.6
August	R664.2	R527.5	R574.2	R785.6	R831.6	R1,102.5	404.2	R505.8	R212.4	R5,606.9	R2,872.2
September	609.9	566.3	574.2	756.4	1,027.6	1,231.1	374.8	651.2	256.8	6,050.3	3,163.5
October	695.[illegible]	538.7	606.2	689.4	927.6	1,142.0	397.2	506.6	112.8	5,613.2	2,966.4
November	555.4	486.2	455.5	739.0	1,143.3	1,363.7	415.1	624.2	222.0	6,013.4	3,218.3
TOTAL (Year to date)	640.2	530.0	560.0	640.5	881.0	1,096.3	380.2	611.9	212.4	5,557.5	2,894.6

[1]See Definitions
R=Revised data
NA=Not available
Sources: 1972 through 1976: Bureau of Mines (BOM) *Mineral Industry Surveys*, "Petroleum Statement, Annual," January 1977 through April 1977: Bureau of Mines *Mineral Industry Surveys*, "Petroleum Statement, Monthly," May 1977 through August 1978: Energy Information Administration (EIA) *Energy Data Reports*, "Petroleum Statement, Monthly," September 1978 through November 1978: EIA "Monthly Petroleum Statistics Report." December 1978 data are EIA estimates based on data from the American Petroleum Institute (API), "Weekly Statistical Bulletin."

[1]Includes Ecuador, Gabon, Iraq, Kuwait, and Qatar.
R=Revised data
Sources: Direct Imports—Bureau of Mines *Mineral Industry Surveys*, "Petroleum Statement, Monthly" and "PAD District Supply/Demand, Monthly" through April 1977; EIA *Energy Data Reports*, "PAD Districts Supply/Demand, Monthly" for May 1977 through August 1978; EIA "Monthly Petroleum Statistics Report" for September 1978 through November 1978.

Domestic Petroleum Imports from Non-OPEC Sources

	Bahamas	Canada	Mexico	Netherlands Antilles	Puerto Rico	Trinidad and Tobago	Virgin Islands	Other	Total
	Thousands of barrels per day								
1973	178.0	1,312.9	16.2	573.6	99.3	250.6	329.2	523.5	3,274.2
1974	188.3	1,067.6	8.4	508.9	90.4	341.2	301.7	394.2	2,852.4
1975	152.0	946.2	71.4	323.6	89.7	240.9	408.5	308.1	2,435.4
1976	116.5	980.3	67.1	274.6	99.1	272.6	422.3	373.5	2,234.0
1977									
January	170.0	805.9	97.9	304.1	82.5	316.2	619.6	549.8	2,646.0
February	289.5	805.1	168.1	406.6	86.3	406.3	648.8	947.8	3,458.5
March	200.4	561.7	171.6	257.3	97.4	286.5	505.5	810.4	2,890.7
April	130.7	806.1	155.2	110.1	85.3	210.5	409.0	862.4	2,269.3
May	138.5	437.8	173.6	153.7	105.8	308.1	376.2	647.6	2,341.3
June	137.7	493.0	130.7	196.2	89.4	271.1	322.0	616.0	2,306.1
July	169.8	482.9	158.7	239.0	129.7	275.8	477.7	640.1	2,473.7
August	168.8	501.5	213.6	224.5	88.4	281.2	461.6	586.9	2,526.5
September	140.2	528.5	187.6	201.1	156.7	250.9	433.9	750.1	2,629.0
October	122.3	487.0	246.6	197.4	114.1	268.4	451.9	612.9	2,520.6
November	184.4	504.6	230.7	93.3	96.7	257.2	462.8	654.7	2,466.4
December	159.8	580.1	186.5	191.9	97.8	305.5	555.6	579.2	2,656.4
TOTAL	186.9	615.5	178.3	213.7	106.3	286.0	466.2	660.7	2,583.6
1978									
January	167.5	479.7	236.4	215.2	98.0	295.0	456.0	583.3	2,541.1
February	217.6	607.5	221.9	225.2	99.6	295.8	456.6	581.2	2,645.4
March	211.5	436.9	230.9	238.1	63.6	274.2	492.8	560.8	2,508.8
April	140.9	392.4	231.4	256.3	95.0	302.1	371.9	766.7	2,558.7
May	194.3	396.0	257.6	230.6	73.6	189.0	304.0	704.6	2,349.7
June	144.6	472.6	287.1	213.3	117.6	199.3	324.5	883.7	2,442.7
July	166.0	631.0	319.5	201.6	93.8	281.7	402.2	625.4	2,621.2
August	187.7	R422.9	R392.9	R291.0	82.3	R247.6	431.0	R610.4	R2,645.8
September	116.8	441.8	466.6	214.1	95.2	262.0	431.6	835.6	2,857.7
October	105.9	392.6	392.1	169.0	88.5	203.8	476.3	721.6	2,549.8
November	153.8	489.8	381.1	223.4	64.7	211.1	485.7	616.0	2,525.6
TOTAL (Year to date)	184.0	460.7	308.7	225.4	88.2	250.7	424.8	664.3	2,566.8

R=Revised data
Source: Bureau of Mines *Mineral Industry Surveys*, "Petroleum Statement, Monthly" and "PAD Districts Supply/Demand Monthly" through April 1977; EIA *Energy Data Reports*, "PAD Districts Supply/Demand Monthly" for May 1977 through August 1978, and EIA "Monthly Petroleum Statistics Report" for September 1978 through November 1978

Residual Fuel Oil

		Domestic Demand	Production	Imports	Exports	Stocks‡
		Thousands of barrels per day				Thousands of barrels
1972	AVERAGE	2,529	799	1,742	33	196,218
1973	AVERAGE	2,822	971	1,853	23	183,490
1974	AVERAGE	2,639	1,070	1,587	14	158,894
1975	AVERAGE	2,462	1,235	1,223	16	174,126
1976	AVERAGE	2,801	1,377	1,413	12	172,344
1977	January	3,741	1,889	1,596	2	84,749
	February	3,662	1,951	1,943	8	71,414
	March	3,150	1,715	1,417	3	71,186
	April	2,855	1,687	1,125	3	70,165
	May	2,719	1,671	1,145	5	73,376
	June	2,954	1,714	1,181	2	71,924
	July	2,805	1,729	1,271	18	77,770
	August	3,046	1,634	1,441	9	78,762
	September	2,926	1,750	1,458	3	87,522
	October	2,707	1,749	1,218	2	95,896
	November	2,819	1,695	1,094	7	95,155
	December	3,364	1,839	1,348	12	89,673
	AVERAGE	3,069	1,751	1,350	8	- - -
1978	January	3,496	1,872	1,358	13	81,434
	February	3,964	1,801	1,565	10	64,852
	March	3,536	1,758	1,700	22	62,187
	April	2,992	1,554	1,565	7	66,229
	May	2,667	1,646	1,221	16	72,359
	June	2,618	1,582	1,012	4	71,916
	July	2,780	1,593	1,296	10	75,346
	August	R2,939	R1,636	1,264	25	R73,748
	September	2,721	1,669	1,311	NA	81,167
	October	2,653	1,596	1,115	NA	83,210
	November	R2,815	R1,676	R1,345	NA	R88,672
	December	3,161	1,849	1,380	NA	86,274
	AVERAGE	3,023	1,686	1,343	13	

‡Total as of December 31
R=Revised data
NA=Not available
Note: Bureau of Mines' stock average was expanded at the end of 1974 to include an additional 100 bulk terminal operators; the new coverage begins here with 1975
Sources: 1972 through 1976: Bureau of Mines (BOM) *Mineral Industry Surveys*, "Petroleum Statement, Annual;" January 1977 through April 1977: Bureau of Mines *Mineral Industry Surveys*, "Petroleum Statement, Monthly;" May 1977 through August 1978: Energy Information Administration (EIA) *Energy Data Reports*, "Petroleum Statement, Monthly;" September 1978 through November 1978: EIA "Monthly Petroleum Statistics Report;" December 1978 data are EIA estimates based on data from the American Petroleum Institute (API) "Weekly Statistical Bulletin"

Executive Summary (Continued)

Domestic Energy Consumption by Primary Energy Type

		Coal[1]	Natural Gas (dry)	Petroleum	Hydro-electric Power[2]	Nuclear Electric Power	Geothermal Power and Other[3]	Total	Yearly Cumulative Total
		Quadrillion (10^{15}) Btu							
1972	TOTAL	12.461	22.699	32.966	2.929	0.577	0.011	71.643	
1973	TOTAL	13.315	22.512	34.852	3.010	0.890	0.042	74.620	
1974	TOTAL	12.895	21.732	33.488	3.309	1.215	0.117	72.736	
1975	TOTAL	12.842	19.948	32.742	3.219	1.839	0.089	70.678	
1976	January	1.216	2.337	3.177	0.282	0.172	0.006	7.189	7.189
	February	1.076	1.977	2.791	0.266	0.153	0.001	6.266	13.455
	March	1.117	1.758	2.942	0.287	0.145	0.013	6.262	19.717
	April	1.067	1.536	2.749	0.262	0.117	0.004	5.737	25.454
	May	1.070	1.463	2.722	0.276	0.127	0.004	5.668	31.121
	June	1.112	1.362	2.774	0.276	0.168	0.005	5.697	36.818
	July	1.185	1.396	2.829	0.281	0.189	0.007	5.892	42.710
	August	1.194	1.344	2.835	0.258	0.196	0.009	5.836	48.545
	September	1.095	1.328	2.776	0.221	0.184	0.008	5.613	54.158
	October	1.132	1.658	2.912	0.229	0.185	0.013	6.124	60.282
	November	1.151	1.974	3.107	0.216	0.172	0.006	6.607	66.889
	December	1.298	2.277	3.593	0.221	0.225	0.010	7.524	74.413
	TOTAL	13.749	20.345	35.123	3.075	2.037	0.084	74.413	
1977	January	1.287	2.456	3.483	0.233	0.236	0.006	7.710	7.710
	February	1.148	1.854	3.143	0.176	0.209	0.007	6.537	14.247
	March	1.144	1.751	3.016	0.224	0.220	0.008	6.422	20.669
	April	1.057	1.469	2.847	0.212	0.212	0.005	5.852	26.814
	May	1.120	1.405	2.890	0.213	0.227	0.006	5.856	32.370
	June	1.176	1.361	2.916	0.197	0.229	0.007	5.940	38.310
	July	1.277	1.383	2.990	0.193	0.237	0.009	6.054	44.364
	August	1.248	1.395	3.068	0.192	0.240	0.008	6.151	50.515
	September	1.158	1.457	2.924	0.184	0.229	0.015	5.947	56.462
	October	1.144	1.550	3.089	0.197	0.263	0.001	6.144	62.606
	November	1.157	1.745	3.340	0.231	0.291	0.004	6.769	69.375
	December	1.226	2.152	3.415	0.255	0.253	0.013	7.314	76.299
	TOTAL	14.133	19.931	36.947	2.511	2.674	0.103	76.299	
1978	January	R1.237	2.435	3.155	0.279	0.275	0.009	R7.590	R7.590
	February	1.049	2.166	3.212	0.251	0.233	0.008	R6.919	R14.509
	March	R0.999	1.929	3.344	0.275	0.236	0.011	R6.797	R21.306
	April	R1.038	1.645	2.921	R0.281	0.187	0.017	R5.989	R27.295
	May	R1.111	1.347	3.089	R0.312	0.218	0.021	R6.138	R33.433
	June	R1.186	1.246	3.011	R0.280	0.236	0.014	R5.977	R39.410
	July	R1.262	1.335	3.004	R0.277	0.261	0.020	R6.160	R45.564
	August	R1.303	1.281	R3.171	R0.248	0.273	0.020	R6.296	R51.860
	September	1.229	R1.248	2.946	R0.238	0.237	0.019	R5.916	R57.776
	October	1.173	1.419	3.117	R0.221	0.245	R0.017	R6.192	R63.968
	November	1.186	1.685	3.111	0.226	0.265	0.019	6.491	70.459
	December	**1.271	2.113	3.744	**0.241	**0.326	**0.017	**7.213	**77.672
	TOTAL	14.044	19.779	37.526	3.131	3.002	0.191	77.672	

[1] Includes bituminous coal, lignite, and anthracite coal.
[2] Includes industrial and utility production and net imports of electricity.
[3] Other includes electricity produced from wood and waste and net imports of coke.
**Estimated data.
R=Revised data.
Note: Totals may not equal sum of components due to independent rounding.
Source: EIA calculations based on data reported elsewhere in this publication.

Executive Summary (Continued)

Domestic Energy Consumption by Economic Sector[1]

		Residential/ Commercial	Industrial	Transportation	Total
		Quadrillion (10^{15}) Btu			
1973	TOTAL	26.579	29.171	18.870	74.620
1974	TOTAL	25.939	28.543	18.255	72.736
1975	TOTAL	26.202	26.117	18.359	70.678
1976	January	3.124	2.436	1.630	7.189
	February	2.691	2.114	1.463	6.268
	March	2.433	2.203	1.626	6.262
	April	2.087	2.070	1.580	5.737
	May	1.919	2.193	1.553	5.665
	June	1.864	2.232	1.595	5.691
	July	1.975	2.279	1.637	5.891
	August	1.983	2.266	1.590	5.839
	September	1.864	2.211	1.558	5.613
	October	1.956	2.568	1.600	6.124
	November	2.377	2.584	1.647	6.607
	December	3.612	2.718	1.794	7.524
	TOTAL	27.270	27.871	19.272	74.413
1977	January	3.432	2.894	1.720	7.710
	February	2.981	1.970	1.586	6.537
	March	2.801	2.069	1.652	6.422
	April	2.109	2.120	1.625	5.852
	May	1.932	2.318	1.606	5.856
	June	1.918	2.423	1.649	5.940
	July	2.122	2.261	1.670	6.054
	August	2.177	2.341	1.685	6.151
	September	1.974	2.359	1.614	5.947
	October	2.019	2.475	1.651	6.144
	November	R2.218	R2.506	1.645	6.369
	December	2.644	2.668	1.807	7.314
	TOTAL	28.231	28.156	19.913	76.299
1978	January	R2.269	R2.596	1.701	R7.590
	February	2.150	R2.152	1.617	R6.919
	March	R2.870	R2.149	1.775	R6.791
	April	2.255	R2.120	1.617	R5.989
	May	2.120	R2.279	1.737	R6.136
	June	R2.038	R2.235	1.704	R5.977
	July	2.171	R2.306	1.684	R6.160
	August	R2.166	R2.343	1.765	R6.296
	September	R2.031	R2.254	1.630	R5.916
	October	R2.059	R2.441	1.692	R6.192
	November	2.294	2.480	1.717	6.491
	December	**2.861	**2.552	**1.774	**7.213
	TOTAL	29.351	27.903	20.418	77.672

[1] See Explanatory Note 6 for definitions of the Residential/Commercial, Industrial, and Transportation sectors. The methodology used for sector calculations is provided in the footnotes on page 22.
**Estimated data.
R=Revised data.
Note: Totals may not equal sum of components due to independent rounding.
Source: See footnotes on page 22.

Energy Consumption (Continued)

Energy Consumption by the Residential and Commercial[1] Economic Sector[1]

		Coal	Natural Gas (dry)	Petroleum[2]	Electricity Distributed	Electrical Energy Loss Distributed	Total Energy Use	Yearly Cumulative Total Energy Use
		Quantities (10[15] Btu						
1973	TOTAL	0.295	7.577	7.077	3.445	8.184	26.579	
1974	TOTAL	0.297	7.427	6.484	3.424	8.307	25.939	
1975	TOTAL	0.253	7.688	6.138	3.536	8.588	26.202	
1976	January	0.031	1.254	0.659	0.34[illegible]	0.819	3.124	3.124
	February	0.019	1.[illegible]	0.[illegible]	0.2[illegible]	0.[illegible]	2.[illegible]	5.514
	March	0.018	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	8.[illegible]
	April	0.020	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	10.[illegible]
	May	0.016	0.488	0.[illegible]	0.[illegible]	0.[illegible]	1.[illegible]	12.[illegible]
	June	0.015	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	1.[illegible]	14.[illegible]
	July	0.011	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	1.[illegible]	16.[illegible]
	August	0.015	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	1.[illegible]	18.[illegible]
	September	0.016	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	1.[illegible]	19.[illegible]
	October	0.020	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	21.[illegible]
	November	0.025	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	24.[illegible]
	December	0.038	1.08[illegible]	0.[illegible]	0.[illegible]	0.834	3.[illegible]	27.270
	TOTAL	0.243	7.706	6.734	3.676	8.911	27.270	
1977	January	0.035	1.37[illegible]	0.7[illegible]	0.3[illegible]	0.[illegible]	3.[illegible]	3.[illegible]
	February	0.024	1.2[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	6.[illegible]
	March	0.019	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	8.[illegible]
	April	0.020	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	11.[illegible]
	May	0.016	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	1.[illegible]	12.[illegible]
	June	0.015	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	1.[illegible]	14.[illegible]
	July	0.014	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	17.[illegible]
	August	0.014	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	19.[illegible]
	September	0.015	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	1.[illegible]	21.[illegible]
	October	0.018	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	23.[illegible]
	November	0.025	R0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	R2.[illegible]	R25.[illegible]
	December	0.030	0.952	0.604	0.[illegible]	0.851	2.[illegible]	R28.[illegible]
	TOTAL	0.246	7.500	7.114	3.883	9.487	28.231	
1978	January	R0.028	1.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	R3.[illegible]	R3.[illegible]
	February	0.029	1.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	3.[illegible]	R6.[illegible]
	March	0.023	1.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	R2.[illegible]	R9.[illegible]
	April	0.020	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	R11.[illegible]
	May	0.018	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	R13.[illegible]
	June	R0.017	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	R2.[illegible]	R15.[illegible]
	July	0.015	0.[illegible]	0.[illegible]	0.[illegible]	R0.[illegible]	2.[illegible]	R17.[illegible]
	August	R0.016	0.[illegible]	R0.[illegible]	0.[illegible]	R0.[illegible]	R2.[illegible]	R20.[illegible]
	September	R0.018	0.[illegible]	R0.[illegible]	0.[illegible]	R0.[illegible]	R2.[illegible]	R22.[illegible]
	October	R0.022	0.[illegible]	0.[illegible]	R0.[illegible]	R0.[illegible]	R2.[illegible]	R24.[illegible]
	November	0.024	0.[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	26.[illegible]
	December	0.029	0.995	0.[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	29.[illegible]
	TOTAL	0.260	7.849	7.114	4.052	10.075	29.351	

(See footnotes on page 26)
Source: See footnotes on page 22

Energy Consumption (Continued)

Energy Consumption by the Transportation Economic Sector[1]

		Coal	Natural Gas[3] (dry)	Petroleum	Electricity Distributed	Electrical Energy Loss Distributed	Total Energy Use	Yearly Cumulative Total Energy Use
		Quadrillion (10[15] Btu						
1973	TOTAL	0.003	0.732	17.940	0.058	0.138	18.870	
1974	TOTAL	0.002	0.656	17.382	0.060	0.145	18.256	
1975	TOTAL	0.001	0.601	17.944	0.082	0.161	18.359	
1976	January	negl	0.077	1.533	0.006	0.015	1.630	1.630
	February	negl	0.064	1.382	0.006	0.012	1.464	3.093
	March	negl	0.055	1.532	0.006	0.013	1.626	4.718
	April	negl	0.047	1.514	0.005	0.012	1.580	6.298
	May	negl	0.043	1.493	0.005	0.012	1.553	7.851
	June	negl	0.036	1.545	0.005	0.012	1.598	9.450
	July	negl	0.036	1.561	0.005	0.013	1.617	11.067
	August	negl	0.036	1.538	0.005	0.013	1.592	12.679
	September	negl	0.037	1.504	0.005	0.011	1.556	14.237
	October	negl	0.050	1.531	0.005	0.013	1.600	15.836
	November	negl	0.061	1.561	0.005	0.014	1.642	17.478
	December	negl	0.074	1.699	0.006	0.015	1.794	19.272
	TOTAL	negl	0.619	18434	0.064	0.155	19.272	
1977	January	negl	0.081	1.620	0.006	0.016	1.722	1.722
	February	negl	0.059	1.503	0.005	0.012	1.580	3.303
	March	negl	0.054	1.586	0.005	0.012	1.652	4.955
	April	negl	0.045	1.564	0.005	0.012	1.625	6.581
	May	negl	0.041	1.549	0.005	0.013	1.608	8.189
	June	negl	0.037	1.594	0.005	0.012	1.649	9.838
	July	negl	0.036	1.616	0.005	0.013	1.670	11.508
	August	negl	0.037	1.635	0.005	0.012	1.689	13.197
	September	negl	0.040	1.657	0.005	0.011	1.614	14.811
	October	negl	0.045	1.587	0.005	0.012	1.650	16.461
	November	negl	0.053	1.671	0.006	0.014	1.645	18.105
	December	negl	0.069	1.716	0.006	0.015	1.807	19.913
	TOTAL	negl	0.590	19.094	0.064	0.156	19.913	
1978	January	negl	0.079	1.600	0.006	0.016	1.701	1.701
	February	negl	0.060	1.544	0.005	0.014	1.612	3.313
	March	negl	0.061	1.696	0.005	0.012	1.775	5.089
	April	negl	0.047	1.552	0.005	0.012	1.617	6.705
	May	negl	0.040	1.679	0.005	0.013	1.737	8.442
	June	negl	0.033	1.653	0.005	0.013	1.704	10.147
	July	negl	0.035	1.631	0.005	0.013	1.684	11.830
	August	negl	0.033	1.717	0.005	0.014	1.769	R13.600
	September	negl	R0.034	1.581	0.005	0.012	1.632	R15.232
	October	negl	0.041	1.639	0.006	0.013	1.699	R16.931
	November	negl	0.052	1.640	0.006	0.014	1.712	18.643
	December	negl	0.068	1.685	0.006	0.015	1.774	20.418
	TOTAL	negl	0.594	19.596	0.065	0.162	20.418	

[1] See Explanatory Note 6 for definitions of the Residential and Commercial, Industrial, and Transportation Sectors. The methodology used in sector calculations is provided in footnotes on page 22. Printed totals may differ slightly from the sum of the rounded figures due to independent rounding.
[2] The percentage share used in calculating Residential and Commercial consumption of petroleum was 52.5 percent for 1973 and 50.7 percent for 1974, 1975, 1976, 1977, and 1978.
[3] The percentage share used in calculating Industrial consumption of petroleum was 47.5 percent for 1973 and 49.3 percent for 1974, 1975, 1976, 1977, and 1978.
[4] The percentage share used in calculating Transportation consumption of natural gas was 3.9 percent for 1973 and 3.6 percent for 1974, 1975, 1976, 1977, and 1978. This percentage share is applied to total natural gas minus electric utility consumption.
R=Revised data.
Source: See footnotes on page 22

Energy Consumption by the Industrial Economic Sector[1]

		Coal	Natural Gas (dry)	Petroleum[2]	Hydro electric	Electricity Distributed	Electrical Energy Loss Distributed	Total Energy Use	Yearly Cumulative Total Energy Use
		Quadrillion (10^{15}) Btu							
1973	TOTAL	6.377	10.457	6.603	0.035	2.341	6.359	29.171	
1974	TOTAL	6.069	10.132	6.305	0.033	2.337	6.667	28.643	
1975	TOTAL	5.769	9.413	5.965	0.032	2.304	6.536	26.117	
1976	January	0.516	0.798	0.641	0.003	0.196	0.483	2.416	2.416
	February	0.469	0.619	0.564	0.[illegible]	0.188	0.473	2.314	4.730
	March	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.206	0.[illegible]	2.[illegible]	6.[illegible]
	April	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.205	0.[illegible]	2.[illegible]	9.[illegible]
	May	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.209	0.[illegible]	2.[illegible]	11.[illegible]
	June	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.214	0.[illegible]	2.[illegible]	13.[illegible]
	July	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.213	0.[illegible]	2.[illegible]	15.[illegible]
	August	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.218	0.[illegible]	2.[illegible]	17.[illegible]
	September	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.220	0.[illegible]	2.[illegible]	19.[illegible]
	October	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.218	0.[illegible]	2.[illegible]	21.[illegible]
	November	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.215	0.[illegible]	2.[illegible]	23.[illegible]
	December	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.214	0.[illegible]	2.[illegible]	25.[illegible]
	TOTAL	5.776	8.867	6.548	0.033	2.525	8.124	27.871	
1977	January	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.210	0.[illegible]	2.[illegible]	2.[illegible]
	February	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	4.[illegible]
	March	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	6.[illegible]
	April	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	8.[illegible]
	May	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	11.[illegible]
	June	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	13.[illegible]
	July	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	15.[illegible]
	August	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	18.[illegible]
	September	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	20.[illegible]
	October	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	22.[illegible]
	November	0.[illegible]	R0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	R2.[illegible]	R25.[illegible]
	December	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	R28.[illegible]
	TOTAL	3.577	8.647	6.917	0.036	2.618	8.443	29.156	
1978	January	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	R2.[illegible]	R2.[illegible]
	February	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	R2.[illegible]	R2.[illegible]
	March	R0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	R2.[illegible]	R5.[illegible]
	April	R0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	R2.[illegible]	R8.[illegible]
	May	R0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	R2.[illegible]	R11.[illegible]
	June	R0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	R2.[illegible]	R13.[illegible]
	July	R0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	R2.[illegible]	R16.[illegible]
	August	R0.[illegible]	0.[illegible]	R0.[illegible]	[illegible]	0.[illegible]	R0.[illegible]	R2.[illegible]	R18.[illegible]
	September	R0.[illegible]	R0.[illegible]	R0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	R2.[illegible]	R20.[illegible]
	October	R0.[illegible]	R0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	R0.[illegible]	R2.[illegible]	R23.[illegible]
	November	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	25.[illegible]
	December	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	0.[illegible]	0.[illegible]	2.[illegible]	27.[illegible]
	TOTAL	3.684	6.046	6.918	0.035	2.[illegible]	8.[illegible]	27.803	

(See footnotes on page 26)
Source: See footnotes on page 26

Oil and Gas Exploration and Development

		Rotary Rigs in Operation		Exploratory and Development Wells Drilled[1]				Total Footage of Wells Drilled[1]
		Monthly Average		Oil	Gas	Dry	Total	Thousands of feet
1972	AVERAGE	1,107	TOTAL	11,308	4,828	11,867	27,291	134,602
1973	AVERAGE	1,194	TOTAL	9,902	6,385	10,905	28,582	136,391
1974	AVERAGE	1,475	TOTAL	12,784	7,240	11,674	31,698	166,851
1975	AVERAGE	1,660	TOTAL	16,608	7,660	13,247	37,235	194,434
1976	January	1,710		1,465	772	1,055	3,292	14,517
	February	1,594		1,[illegible]	852	1,159	3,152	14,888
	March	1,540		1,[illegible]	821	1,301	3,[illegible]	18,[illegible]
	April	1,480		1,[illegible]	672	894	2,[illegible]	13,765
	May	1,[illegible]		1,[illegible]	658	1,[illegible]	3,[illegible]	14,195
	June	1,568		1,600	709	1,123	3,332	14,780
	July	1,[illegible]		1,[illegible]	710	916	2,958	13,716
	August	1,[illegible]		1,[illegible]	711	1,[illegible]	3,116	14,697
	September	1,[illegible]		1,[illegible]	809	1,[illegible]	3,582	16,[illegible]
	October	1,[illegible]		1,[illegible]	760	1,[illegible]	3,269	14,[illegible]
	November	1,[illegible]		1,[illegible]	646	1,[illegible]	3,[illegible]	14,[illegible]
	December	1,[illegible]		1,[illegible]	606	1,[illegible]	3,[illegible]	17,[illegible]
	AVERAGE	1,586	TOTAL	17,069	8,085	13,621	38,785	181,780
1977	January	1,[illegible]		1,[illegible]	732	1,[illegible]	3,219	14,517
	February	1,[illegible]		1,[illegible]	701	999	3,[illegible]	14,443
	March	1,[illegible]		1,[illegible]	896	1,[illegible]	4,[illegible]	19,[illegible]
	April	1,[illegible]		1,[illegible]	846	1,[illegible]	3,[illegible]	15,[illegible]
	May	1,[illegible]		1,[illegible]	877	1,[illegible]	3,[illegible]	16,[illegible]
	June	2,[illegible]		1,[illegible]	962	1,[illegible]	3,[illegible]	18,[illegible]
	July	2,[illegible]		1,[illegible]	724	1,[illegible]	3,[illegible]	14,[illegible]
	August	2,[illegible]		1,[illegible]	981	1,[illegible]	3,[illegible]	16,[illegible]
	September	2,[illegible]		1,[illegible]	1,105	1,[illegible]	4,[illegible]	19,[illegible]
	October	2,[illegible]		1,[illegible]	1,004	1,[illegible]	3,[illegible]	18,[illegible]
	November	2,113		1,[illegible]	1,091	1,[illegible]	4,[illegible]	19,[illegible]
	December	2,141		1,[illegible]	1,[illegible]	1,[illegible]	4,[illegible]	21,[illegible]
	AVERAGE	2,001	TOTAL	18,912	11,378	14,692	44,982	210,848
1978	January	2,128		1,[illegible]	783	1,[illegible]	3,[illegible]	15,[illegible]
	February	2,[illegible]		1,[illegible]	851	1,[illegible]	3,[illegible]	16,[illegible]
	March	2,158		1,[illegible]	1,[illegible]	1,[illegible]	4,[illegible]	20,[illegible]
	April	2,[illegible]		1,[illegible]	971	1,[illegible]	3,[illegible]	17,[illegible]
	May	2,[illegible]		1,[illegible]	1,[illegible]	1,[illegible]	3,[illegible]	17,[illegible]
	June	2,[illegible]		1,[illegible]	1,[illegible]	1,[illegible]	4,[illegible]	21,[illegible]
	July	2,[illegible]		1,[illegible]	985	1,[illegible]	3,[illegible]	17,[illegible]
	August	2,[illegible]		1,[illegible]	1,[illegible]	1,[illegible]	3,[illegible]	18,[illegible]
	September	2,[illegible]		1,[illegible]	1,[illegible]	1,[illegible]	4,[illegible]	21,[illegible]
	October	2,[illegible]		1,[illegible]	1,[illegible]	1,[illegible]	3,[illegible]	19,[illegible]
	November	2,[illegible]		1,294	1,027	1,[illegible]	3,[illegible]	17,[illegible]
	December	2,[illegible]		1,[illegible]	1,[illegible]	1,[illegible]	5,[illegible]	24,[illegible]
	AVERAGE	2,259	TOTAL	17,744	12,948	16,224	46,916	226,416

[1]Excludes service wells and stratigraphic and core tests.
NA=Not available.
Note: Totals reflect subsequent data revisions and therefore may not agree with cumulative monthly data.
Sources: Rotary Rigs: Hughes Tool Company "Rotary Rigs Running by State". Wells: American Petroleum Institute "Monthly Drilling Report" and "Quarterly Review of Drilling Statistics for the United States".

Crude Oil (Continued)

Estimated Landed Cost of Imports From Selected Countries[1]

		Algeria	Canada	Indonesia	Iran	Libya	Nigeria	Saudi Arabia	U.A. Emirates	Venezuela
		Dollars per barrel								
1975	AVERAGE	12.72	12.72	13.79	12.21	12.35	12.62	12.30	12.87	11.65
1976	January	13.56	12.95	13.89	13.01	13.52	13.61	13.18	13.50	11.80
	February	13.57	13.24	13.94	12.87	13.45	13.52	13.21	13.36	12.09
	March	13.63	13.30	13.94	12.77	13.36	13.62	13.18	13.37	11.71
	April	13.73	13.61	13.78	12.91	13.38	13.60	13.11	13.18	11.95
	May	13.47	13.62	13.84	12.82	13.59	13.62	13.05	13.39	11.61
	June	13.75	14.19	13.84	13.00	13.38	13.78	13.14	13.09	11.55
	July	13.77	13.79	13.80	12.76	13.53	13.81	13.02	13.45	11.44
	August	13.91	13.78	13.78	13.09	13.51	13.87	13.03	13.23	11.77
	September	14.03	13.70	13.80	12.78	13.72	13.82	12.87	13.44	11.98
	October	13.81	13.71	13.84	12.73	13.83	13.99	12.87	13.22	11.84
	November	13.84	13.59	13.77	12.58	13.73	13.95	13.01	13.18	12.01
	December	14.14	13.52	13.75	12.69	13.79	14.11	13.02	13.29	12.19
	AVERAGE	13.81	13.57	13.82	12.82	13.58	13.80	13.04	13.30	11.80
1977	January	14.80	13.92	14.42	13.16	14.64	14.97	13.22	13.56	13.29
	February	15.18	13.74	14.57	13.56	15.12	15.12	13.32	13.46	13.76
	March	15.08	14.34	14.64	13.94	14.88	15.13	13.50	13.80	13.41
	April	15.21	14.02	14.70	13.95	15.12	15.37	13.41	13.78	13.19
	May	15.20	14.94	14.59	13.94	14.91	15.40	13.49	13.85	13.10
	June	15.34	14.49	14.63	13.81	14.92	15.37	13.39	13.72	13.06
	July	15.29	13.91	14.75	13.84	14.88	15.39	13.64	14.20	13.02
	August	15.24	14.24	14.65	13.99	14.70	15.25	13.72	14.36	12.82
	September	15.29	14.14	14.62	13.77	14.89	15.34	14.01	14.41	13.08
	October	15.41	14.00	14.67	13.83	14.81	15.31	13.85	14.56	13.16
	November	15.05	14.52	14.73	13.88	14.73	15.23	13.94	14.19	13.11
	December	15.25	14.27	14.58	13.95	14.81	15.21	13.99	14.48	12.99
	AVERAGE	15.20	14.21	14.63	13.80	14.87	15.25	13.61	14.04	13.13
1978	January	15.01	14.37	14.60	13.91	14.63	14.88	13.93	14.40	13.00
	February	14.91	14.31	14.53	13.75	14.85	14.90	13.96	14.07	12.93
	March	14.74	13.56	14.56	14.06	14.62	14.89	14.07	14.44	13.22
	April	14.91	13.50	14.61	13.90	14.43	14.63	13.85	14.42	12.89
	May	14.70	14.39	14.50	13.94	14.56	14.72	13.86	14.20	12.49
	June	14.80	15.07	14.58	13.92	14.45	14.61	13.86	14.48	12.72
	July	14.83	14.64	14.73	13.93	14.65	14.64	13.81	14.29	12.41
	August	14.83	14.78	14.66	13.76	14.64	14.59	13.84	14.49	12.70
	September	14.74	13.92	14.79	13.83	14.62	14.78	14.03	14.36	12.94
	October	14.90	14.73	14.68	13.89	14.81	15.03	13.89	14.61	12.78
	November	15.30	14.72	14.85	13.89	15.04	15.06	14.02	14.38	13.08

[1]See Explanatory Note 16
Source: FEA Form F701-M-0 "Transfer Pricing Report." Data provided by the Economic Regulatory Administration

Crude Oil (Continued)

Estimated FOB Cost of Imports from Selected Countries[1]

		Algeria	Canada	Indonesia	Iran	Libya	Nigeria	Saudi Arabia	U.A. Emirates	Venezuela
		Dollars per barrel								
1976	January	12.96	NA	12.77	11.61	12.34	12.85	11.67	11.91	11.15
	February	12.89	NA	12.77	11.48	12.34	12.85	11.64	11.93	11.61
	March	12.93	NA	12.78	11.45	12.34	12.94	11.71	11.91	11.26
	April	12.98	NA	12.74	11.58	12.39	12.95	11.72	11.94	11.38
	May	13.01	NA	12.76	11.58	12.45	12.97	11.61	11.85	11.10
	June	13.02	NA	12.74	11.62	12.40	12.97	11.64	11.92	11.03
	July	13.06	NA	12.79	11.64	12.64	13.11	11.58	11.88	10.87
	August	13.06	NA	12.75	11.61	12.52	13.08	11.58	11.92	11.19
	September	13.12	NA	12.73	11.66	12.66	13.06	11.55	11.97	11.53
	October	13.09	NA	12.79	11.63	12.70	13.25	11.65	11.92	11.41
	November	13.12	NA	12.71	11.62	12.74	13.25	11.62	11.96	11.58
	December	13.21	NA	12.82	11.78	12.83	13.36	11.65	12.16	11.77
1977	January	14.03	NA	13.41	12.03	13.64	14.11	11.92	12.53	12.91
	February	14.31	NA	13.43	12.36	13.89	14.24	12.04	12.33	13.30
	March	14.29	NA	13.58	12.79	13.87	14.32	12.24	12.51	12.98
	April	14.34	NA	13.55	12.79	13.98	14.51	12.23	12.53	12.62
	May	14.31	NA	13.57	12.78	13.93	14.56	12.23	12.56	12.60
	June	14.35	NA	13.55	12.68	13.94	14.55	12.21	12.44	12.53
	July	14.43	NA	13.61	12.78	13.99	14.52	12.40	12.70	12.48
	August	14.48	NA	13.63	12.80	13.95	14.54	12.56	13.15	12.37
	September	14.43	NA	13.64	12.73	13.99	14.56	12.72	13.20	12.55
	October	14.43	NA	13.65	12.79	13.93	14.48	12.70	13.22	12.72
	November	14.37	NA	13.65	12.75	13.88	14.53	12.73	13.33	12.71
	December	14.44	NA	13.61	12.71	13.85	14.45	12.77	13.27	12.56
1978	January	14.29	NA	13.67	12.62	13.77	14.18	12.70	13.23	12.73
	February	14.21	NA	13.62	12.68	13.91	14.18	12.78	13.18	12.61
	March	14.19	NA	13.62	12.68	13.75	14.13	12.80	13.20	12.86
	April	14.09	NA	13.61	12.68	13.62	13.91	12.74	13.23	12.54
	May	13.99	NA	13.51	12.65	13.59	13.90	12.71	13.05	12.13
	June	14.06	NA	13.63	12.58	13.59	13.90	12.67	13.28	12.32
	July	14.06	NA	13.63	12.70	13.67	13.89	12.65	13.26	12.66
	August	14.05	NA	13.63	12.63	13.66	13.86	12.66	13.27	12.23
	September	14.05	NA	13.69	12.63	13.66	13.97	12.76	13.27	12.38
	October	14.08	NA	13.63	12.64	13.73	14.08	12.59	13.24	12.32
	November	14.13	NA	13.79	12.62	13.97	14.12	12.63	13.29	12.46

[1]The FOB cost excludes all costs related to insurance and transportation. See Explanatory Note 16.
NA = Not available
Source: FEA Form F701-M-0 "Transfer Pricing Report." Data provided by the Economic Regulatory Administration.

Petroleum Consumption

Petroleum Consumption for Major Free World Industrialized Countries

		Total IEA[1]	Japan	West Germany	France[2]	United Kingdom	Canada	Italy[2]
		Thousands of barrels per day						
1973	AVERAGE	29,800	5,000	2,693	2,219	1,974	1,867	1,525
1974	AVERAGE	32,390	4,872	2,408	2,094	1,867	1,830	1,621
1975	AVERAGE	31,235	4,368	2,319	1,925	1,833	1,895	1,488
1976	January	35,100	4,941	2,464	2,438	1,879	1,785	1,775
	February	34,400	5,246	2,497	2,486	1,932	1,754	1,743
	March	34,300	5,165	2,747	2,381	1,879	1,747	1,641
	April	31,500	4,526	2,339	2,100	1,716	1,508	1,423
	May	29,900	4,218	2,320	1,796	1,417	1,512	1,253
	June	31,300	4,429	2,393	1,593	1,416	1,551	1,236
	July	31,100	4,416	2,624	1,629	1,346	1,514	1,355
	August	31,100	4,461	2,515	1,668	1,276	1,575	1,372
	September	32,200	4,517	2,521	1,974	1,477	1,512	1,604
	October	32,300	4,523	2,391	1,904	1,564	1,554	1,464
	November	35,900	5,160	2,700	2,236	1,750	1,820	1,393
	December	39,100	5,846	2,571	2,712	1,869	2,000	1,779
	AVERAGE	33,180	4,786	2,507	2,075	1,607	1,683	1,603
1977	January	37,700	5,433	2,393	2,519	1,830	1,788	1,696
	February	38,600	6,025	2,446	2,386	1,844	1,912	1,823
	March	35,000	5,536	2,523	2,109	1,818	1,660	1,573
	April	32,800	4,714	2,431	2,043	1,611	1,513	1,326
	May	31,300	4,314	2,364	1,846	1,546	1,520	1,268
	June	32,900	4,464	2,475	1,715	1,453	1,660	1,344
	July	31,800	4,716	2,381	1,349	1,306	1,500	1,251
	August	32,700	4,705	2,419	1,396	1,369	1,690	1,140
	September	33,400	4,742	2,517	1,783	1,555	1,535	1,502
	October	33,300	4,664	2,324	1,882	1,545	1,628	1,405
	November	34,300	5,093	2,649	2,181	1,895	1,720	1,605
	December	37,900	5,800	2,719	2,512	1,873	1,959	1,817
	AVERAGE	34,300	5,015	2,478	1,973	1,639	1,668	1,478
1978	January	36,600	5,245	2,461	2,646	1,823	1,798	1,776
	February	35,900	5,966	3,013	2,601	1,899	1,977	1,915
	March	R36,900	6,821	2,610	2,237	1,840	1,716	1,601
	April	33,400	4,832	2,577	2,045	1,791	1,564	R1,331
	May	32,700	R4,427	2,340	2,134	1,618	1,532	R1,301
	June	R33,300	R4,625	2,611	1,689	1,499	R1,632	R1,358
	July	R32,400	R4,704	2,692	1,365	R1,447	R1,554	R1,329
	August	R34,000	R4,857	2,338	1,326	R1,447	1,682	R1,172
	September	33,400	4,828	2,561	R1,664	1,577	1,605	1,539
	October	NA	4,856	2,632	1,999	NA	NA	1,548
	November	NA	5,465	2,791	2,420	NA	NA	1,791
	AVERAGE (Year to date)	34,700	5,032	2,598	2,007	1,656	1,671	1,511

[1]The 19 signatory nations of the International Energy Agency (IEA) are Austria, Belgium, Canada, Denmark, Federal Republic of Germany, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States.
[2]Not a member of IEA.
[3]Principal products only.
NA=Not available.
R=Revised data.
Note: Total IEA data represent domestic demand in the United States and sales of petroleum products for all other members. Sales exclude refinery fuel, refinery losses, and ocean bunkers. Experience has shown that this total IEA quantity is between 93 and 95 percent of total IEA consumption.
Source: Central Intelligence Agency, National Foreign Assessment Center, *International Energy Statistical Review*, 7 February 1979.

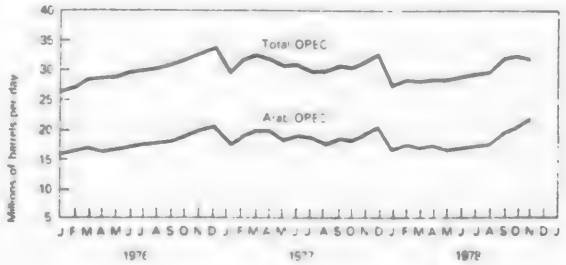
Crude Oil Production

Crude Oil Production for Major Petroleum Exporting Countries

Country	1972 Year	1973 Year	1974 Year	1975 Year	1976 Year	1977 Year	November 1978 Production Capacity: Production	Maximum Sustainable	Unused
	Thousands of barrels per day								
Algeria	1,040	1,070	960	960	990	1,040	1,230	1,300	70
Iraq	1,465	2,020	1,970	2,260	2,415	2,330	3,100	3,100	0
Kuwait[1]	3,283	3,020	2,545	2,085	2,145	1,970	2,650	2,900	250
Libya	2,239	2,175	1,520	1,480	1,935	2,080	2,100	2,300	200
Qatar	482	570	520	440	495	430	480	600	120
Saudi Arabia[1]	6,016	7,595	8,480	7,075	8,575	9,200	10,250	10,700	450
United Arab Emirates	1,202	1,535	1,680	1,665	1,935	2,010	1,830	2,350	520
Subtotal Arab OPEC	15,727	17,985	17,675	15,985	18,490	19,060	21,640	23,250	1,610
Ecuador	78	210	175	160	185	180	200	225	25
Gabon	124	150	200	225	225	230	220	225	5
Indonesia	1,080	1,340	1,375	1,305	1,505	1,695	1,590	1,700	110
Iran	5,010	5,860	6,020	5,350	5,885	5,660	3,490	6,600	3,110
Nigeria	1,915	2,055	2,255	1,785	2,070	2,100	2,280	2,300	20
Venezuela	3,219	3,365	2,975	2,345	2,295	2,240	2,250	2,400	150
Subtotal Non-Arab OPEC	11,340	12,980	13,000	11,170	12,165	12,240	10,030	13,450	3,420
TOTAL OPEC	27,067	30,965	30,675	27,135	30,655	31,160	31,670	36,700	5,030
Canada	1,540	1,800	1,695	1,465	1,300	1,320	1,520	1,800	280
Mexico	440	465	580	720	850	980	1,330	1,500	170
TOTAL OPEC, Canada, Mexico	29,047	33,230	32,950	29,315	32,805	33,460	34,520	40,000	5,480
TOTAL WORLD	50,360	55,755	56,875	52,990	57,340	59,520	62,900		

[1]Includes about one-half of the former Kuwait-Saudi Arabia Neutral Zone. Production in November 1978 amounted to approximately 600,000 barrels per day.
Sources: Central Intelligence Agency, National Foreign Assessment Center, *International Energy Statistical Review*, 7 February 1979; National Energy Board of Canada; and U.S. Department of Energy.

OPEC Countries Crude Oil Production



APPENDIX B—STATUS OF REGULATORY SUPPLY MANAGEMENT AND DEMAND RESTRAINT PLANS

REGULATORY SUPPLY MANAGEMENT AND DEMAND RESTRAINT PLANS

Standby Crude Oil Allocation and Price Regulations, and Refinery Yield Program

Proposed standby regulations were published in the FEDERAL REGISTER on February 10, 1978, and covered the following regulatory programs:

Standby Crude Oil Allocation Program.

Emergency Standby Mandatory Allocation Crude Oil Pricing Program.

Refinery Yield Control Program.

Public hearings were held in June 1978, and a further hearing was held on September 26, 1978, regarding a provision for the allocation of crude oil to product importers.

The final standby regulations were published on January 16, 1979, and further comments were requested by March 15.

Standby Product Allocation and Pricing Regulations

Standby product allocation and pricing regulations were promulgated and published in a Notice of Proposed Rulemaking in the FEDERAL REGISTER in July 1978. Public hearings began in Washington, D.C. on September 12, 1978. Following the review of comments offered, final regulations were published in the FEDERAL REGISTER on January 18, 1979. Further comments were requested by March 15.

Gasoline Rationing

Background.—Federal planning for gasoline rationing was first undertaken in the fall of 1973 as one of several possible responses to declining domestic petroleum production and to the growing dependence of the United States on foreign sources of supply. These efforts were accelerated during the 1973-74 embargo and implementation activities were initiated. After the embargo, the Federal Energy Administration decided, in 1975, to complete the rationing planning process begun during the embargo, and a draft plan was prepared.

In December 1975, Congress passed and the President signed the Energy Policy and Conservation Act (EPCA) which required among other things, the development of a gasoline rationing contingency plan. During early 1976, the FEA prepared a draft rationing plan to meet the EPCA requirement. Proposed regulations were published in the FEDERAL REGISTER and hearings were held in several cities. In January 1977, the rationing plan was prepared for submission to Congress. After the current Administration assumed office, however, it was decided to delay the Congressional review process until there was a reevaluation of the plan's provisions.

Current Status.—The reevaluation of the previous rationing plan has led to important changes to make it more quickly implementable and more effective. A revised plan was published in proposed form in the FEDERAL REGISTER of June 28, 1978, and public hearings were held during July and August, resulting in over 1,000 oral and written comments. The President transmitted the plan to Congress on March 1, 1979.

Conservation Contingency Plans

Background.—The Energy Policy and Conservation Act of 1975 required the Administration to develop conservation contingency plans for petroleum emergencies. Six such plans were developed during the previous Administration, covering the areas of:

Heating, cooling and hot water restrictions;

Commuter parking management and carpooling incentives;

Weekend gasoline and diesel fuel retail distribution restrictions;

Boiler combustion efficiency requirements;

Restrictions on illuminated advertising;

Restrictions on certain gas lighting.

These plans were prepared for submission to Congress in 1976 but were withheld by the current Administration for further evaluation and study.

Current Status.—On March 1, 1979, the President submitted the following plans to the Congress:

Plan No. 1—*Emergency Weekend Gasoline Sales Restrictions.* This program would allow DOE to prohibit owners or operators of retail stations from dispensing gasoline and diesel fuel during designated weekend hours, except to specified commercial and emergency vehicles.

Plan No. 2—*Emergency Building Temperature Restrictions.* Under this plan, DOE could impose energy reducing heating, cooling and hot water temperature restrictions on the owners and operators of commercial and public buildings.

Plan No. 3—*Emergency Advertising Lighting.* This plan would allow DOE to prohibit the use of illuminated advertising signs except for those necessary during business hours to identify a business and the goods or services it offers and to direct customers to it.

We are also analyzing and evaluating a number of new contingency conservation plans. We expect to complete the development of a selected group of these additional plans during FY 1979.

APPENDIX C—PRESENT AND PROJECTED QUANTITIES OF PETROLEUM STORED IN THE STRATEGIC PETROLEUM RESERVE

The Department of Energy is in the process of implementing plans for the storage of an initial 250 million barrels of petroleum in the Strategic Petroleum Reserve (SPR). As of February 11, 1979, 77,000,000 barrels had been delivered to the SPR and it is expected that a goal of 248 million barrels will be met by the end of 1980. However, in view of the Iranian situation it is uncertain whether the current rate of fill, which is 10 million barrels a month, can be maintained. DOE plans currently call for a total of 348 million barrels to be purchased and stored by the end of 1981, 418 million by the end of 1982, and 524 million by the end of 1983. The Department also has submitted to the Congress, in Energy Action DOE No. 1, May 1978, a second amendment to the SPR Plan, this amendment became effective in June, 1978, and provides for expansion of the SPR program to one billion barrels of petroleum, to be in storage by 1985; however, specific implementation plans have not been formulated nor have funding decisions been made as of this date.

APPENDIX D—PRODUCTION PROJECTIONS FOR NEW AND EMERGING TECHNOLOGIES.*

Production of energy from new and emerging energy technologies currently comprises a negligible portion of domestic energy needs. In the near future, however, energy production from solar, wind, and geothermal sources is expected to provide a small but increasingly significant contribution to domestic energy self-sufficiency, as the following table illustrates:

*These projections have been developed by the Energy Information Administration of DOE. Because the assumptions upon which the projections are based constantly change and are subject to differing interpretations, the data expressed herein solely represent the conclusions of the Energy Information Administration.

PRODUCTION LIMITS FOR NEW AND EMERGING TECHNOLOGIES

(Trillions of Btu Per Year)

	1985		1990	
	Lowest of limit	Highest of limit	Lowest of limit	Highest of limit
Synthetic Fuels:				
Shale Oil	100	100	100	425
Syncrude & liquid boiler fuels from coal	68	68	68	275
High Btu coal gas	91	91	185	365
Medium Btu coal gas	0	0	340	340
Methanol (from coal)	0	0	0	33
Solid Waste Conversion [2]	0	126	0	400
Subtotal	(265)	(385)	(879)	(1,838)
Geothermal Central Electric [1, 3]	73	73	194	194
Dispersed	6	10	10	30
Subtotal	(79)	(83)	(204)	(224)
Central Electric Technologies:				
Wind Systems [1]	1	1	7	7
Photovoltaic & Solar Thermal	2	2	14	14
Ocean Thermal	1	1	6	6
Biomass or electricity [1]	9	13	18	30
Low-Med Btu-Combined [1] Cycle	0	0	0	250
Subtotals [3]	(13)	(16)	(45)	(307)
Dispersed Technologies Solar & Wood Heat & Cooling of bldgs	27	82	80	104
Photovoltaic	0	0	1	2
Wind	1	2	5	20
Subtotals [4]	(28)	(34)	(72)	(126)

PRODUCTION LIMITS FOR NEW AND EMERGING TECHNOLOGIES—Continued

(Trillions of Btu Per Year)

	1985		1990	
	Lowest of limit	Highest of limit	Lowest of limit	Highest of limit
Industrial/Ag:				
Solar Process Heat	20	50	60	250
Biomass (over 1978 levels)	100	200	200	500
Subtotals	(120)	(250)	(260)	(750)
Transportation Liquids from biomass (gasohol)	2	5	15	40
Total	507	773	1,475	3,285
Adjusted Total	(707)	(1,013)	(2,025)	(4,413)
Oil Equivalent (MMB/D) [6]	330	477	953	2,077

The amounts shown are technically possible and on a case by case bases economically possible, but in an integrative analysis the technologies here noted frequently do not enter the forecast in the amounts shown.

The solid waste conversion figures are highly uncertain and are currently being reviewed.

[1] The amounts shown for centralized electricity is the heat value of the electricity produced. An estimate of the heat value of the possible fuel saved to generate the same amount of electricity can be obtained by multiplying the figures shown by 3.

[2] It is estimated that one-half the energy saved by these dispersed technologies is electricity. The heat value of the fuel saved in electricity generation can be estimated by taking one-half of the figure shown and multiplying it by 3.

The adjusted total is an estimate of heat value of gas and oil saved by using the new technologies at the limit shown. The adjustment for heat losses in electricity generation is included in these figures.

[3] The oil equivalent figure is shown for the adjusted totals. It was computed assuming 5.82 × 1,000,000 Btu per barrel of crude oil.

APPENDIX E—IMPACT OF THE CURTAILMENT OF IRANIAN EXPORTS, "THE OUTLOOK FOR THE IMPLEMENTATION OF THE INTERNATIONAL ENERGY AGREEMENT'S EMERGENCY OIL SUPPLY PROGRAM," AND THE OUTLOOK FOR ADDITIONAL OIL IMPORTS FROM MEXICO

Shortages Created by the Iranian Situation. The political situation in Iran has resulted in a net reduction in world oil production of approximately 2 million barrels per day compared with the level of late 1978. On the basis of the percentage of reliance upon imports alone, the United States' share of the shortfall would be approximately 500,000 barrels per day. If the International Energy Agreement were triggered, the shortfall could be apportioned ultimately on the basis of total petroleum demand. In that event, the U.S. share of the shortfall could increase to approximately 800,000 barrels per day.

The Iranian situation underscores the danger to national security of excessive consumption of oil and consequent undue dependence upon imported petroleum.

The Outlook for Implementing IEA Sharing Plans. The IEA Governing Board will meet on March 1-2, 1979, to review the impact of the Iranian situation and to discuss appropriate policy responses designed to reduce consumption, increase production, encourage fuel switching, and ensure equitable allocation of available production.

It does not now appear that the emergency oil supply program will be fully implemented. Aggregate oil supplies available to IEA countries have not fallen seven percent below consumption in the base period, which would trigger the emergency sharing mechanism. A limited sharing program could be triggered if oil supplies to any single member country fall 7 percent below its base period consumption. Three or four countries are possible candidates for such selective triggering. If an individual country did trigger the emergency sharing mechanism, it would be required first to reduce its oil consumption by 7 percent.

A voluntary commercial redirection of oil supplies is already underway which should help distribute available supplies to accommodate the more severely affected countries.

The Outlook for Additional Oil Imports from Mexico. Mexican oil production is currently approximately 1.5 million barrels daily of which some 500,000 b/d are being exported. The United States receives about 80-90 percent of Mexican oil exports. Mexico's production efforts are substantial but it is unlikely that oil production can be increased significantly in the near term beyond the levels already targeted. Mexico's end of 1980 production goal is 2.2 million b/d, with exports of about 1.1 million b/d. Beyond 1980, oil production levels will be determined by the Mexican Government; President Lopez Portillo has recently suggested the pace of future development will be somewhat slower than previously expected.

APPENDIX F—THE IMPACT OF THE NEA ON THE REDUCTION OF U.S. OIL IMPORTS

The National Energy Act is principally a longer term program that does not have large potential for reducing oil imports in 1979-80. The principal near term impact will be through the Natural Gas Policy Act, which has created a national market for natural gas and made available to the interstate market substantial volumes of gas that is surplus to the demands of the intrastate markets. If the full potential were realized, the import reduction could be a few hundred thousand barrels per day. In the short term, however, there are institutional and other constraints that will prevent realization of the maximum potential. The acts relating to Conservation, Utility Rate Reform, Coal Conversion, and Energy Tax Credits will have a relatively small impact in 1979 and 1980.

For the longer term, it is projected that the National Energy Act will reduce the demand for imports in 1985 by 2.5 to 3 million barrels per day. Nevertheless, 1985 imports of petroleum are expected to be between 9.0 and 10.0 million barrels per day. Thus, while the NEA is a significant step in the right direction, it will not alone solve the energy and economic problem of heavy dependence upon imports.

APPENDIX G—COMPARISON OF CURRENT DATA WITH THE DATA UTILIZED IN THE 1975 REPORT OF INVESTIGATION OF EFFECT OF PETROLEUM IMPORTS AND PETROLEUM PRODUCTS ON THE NATIONAL SECURITY

1. PERCENT OF DOMESTIC ENERGY CONSUMPTION BY PRIMARY ENERGY TYPE

	1975 Report	Current Data[1]
A. Petroleum	46%	48%
B. Natural Gas	31%	25%
C. Coal	18%	18%
D. Hydroelectric	4%	4%
E. Nuclear	1%	4%

2. CRUDE OIL PRODUCTION

	1975 Report	Current Data
A. World	55	[2]62.9
B. OPEC	30	[3]31.6
C. Communist Countries	11	([4]----)
D. U.S.	8.8	[4]8.7

3. DOMESTIC PETROLEUM PRODUCT DEMAND

1975 Report	Current Data
16.3	[5]18.7

4. CRUDE AND PRODUCT IMPORTS

1975 Report	Current Data
5.8	[6]8.1

5. IMPORTS AS A PERCENT OF DOMESTIC PETROLEUM DEMAND

1975 Report	Current Data
35.6%	[7]43.4%

6. DIRECT CRUDE AND PRODUCT IMPORTS FROM OPEC

1975 Report	Current Data
3.5	[6]5.5

7. INDIRECT CRUDE AND PRODUCT IMPORTS FROM OPEC

1975 Report	Current Data
.85	[6]1.2

8. PERCENTAGE OF TOTAL PETROLEUM IMPORTS ORIGINATING IN OPEC

	1975 Report	Current Data
A. Direct	60%	67.9%
B. Indirect	15%	14.8%
C. Total	75%	82.7%

9. PERCENTAGE OF DOMESTIC PETROLEUM DEMAND ORIGINATING IN OPEC

1975 Report	Current Data
25%	35.8%

10. IMPORTS FROM MAJOR WESTERN HEMISPHERE PRODUCER SUPPLIERS

	1975 Report	Current Data[10]
A. Canada	1.0	.45
B. Venezuela (OPEC)	1.1	.62
C. Mexico	([8])	.31
D. Total as a percent of imports	36%	17%

(All numbers are in Millions of Barrels Per Day unless otherwise noted)

The source for the following data is the Monthly Energy Review; February 1978, published by the Department of Energy:

[1] Numbers equal less than 100% due to rounding—Average for 1978.

[2] November 1978.

[3] *Ibid.*

[4] Average for 1978.

[5] *Ibid.*

[6] *Ibid.*

[7] Average for 1978; DOE not account for refinery loss of processing imported crude.
[8] Average for first eleven months of 1978.
[9] Average for first five months of 1978.
[10] Average for first eleven months of 1978.
[11] No comparable date immediately available.
[12] Not reported.

WASHINGTON, D.C., FEBRUARY 9, 1979.

DEAR MR. MUNDHEIM: I am replying to your letter of February 6, requesting the review, and if needed, revision of my April 3, 1978 letter to you regarding the impact of oil imports on the national security of the United States.

I have reviewed the earlier exchange, and conclude that the comments contained in my April 3 letter are still current, and are responsive to the specific questions posed in your letter of March 27, 1978.

You further requested the Department's views on the impact of the recent cessation of Iranian oil exports on the national security, pursuant to Section 232(b) of the Trade Expansion Act of 1962. The Iranian situation has underscored the serious implications of our dependence upon foreign suppliers for nearly one-half of all petroleum and petroleum products consumed in the United States. It further reinforces our judgment, as stated in my letter of April 3, that oil and oil products are being imported into the United States in such quantities and under such circumstances as to threaten to impair the national security of the United States.

Sincerely,

RICHARD N. COOPER,
Under Secretary of State
For Economic Affairs.

DEPARTMENT OF STATE

WASHINGTON, D.C.,
April 3, 1978.

MR. ROBERT H. MUNDHEIM, *The General Counsel of the Treasury, Washington, D.C.*

DEAR MR. MUNDHEIM: I am responding to your March 27 letter to Secretary Vance requesting the views of the State Department as to whether oil or oil products are being imported into the United States in such quantities or under such circumstances as to threaten to impair the national security of the United States.

Notwithstanding the economic disruption suffered by the United States as a direct consequence of the 1973-74 oil embargo and owing to the massive price increases which came in its wake, our dependence on imported oil has been increasing. Last year, the United States depended upon imports of petroleum and petroleum products to meet almost 50 percent of domestic demand. Forty-seven percent of our crude oil imports came from the Arab nations which imposed the embargo, and another 40 percent came from non-Arab members of the market-dominating Organization of Petroleum Exporting Countries (OPEC).

Thus, the United States remains vulnerable to interruptions in the supply of imported oil and to substantial price increases which could severely disrupt our economy. Furthermore, it is our view, and that of major OPEC producers and our allies, that a continuation of the current trend in United States imports eventually could be a major factor in creating a seller's market for internationally traded oil, increasing the possibility of large oil price increases. Such increases would not only affect the United States economy directly, but seriously damage the prospects for the growth and stability of the world economy.

It is true that there are other countries which are even more heavily dependent on imported oil as a source of energy than is the United States. However, their role in the maintenance of world peace and global security is less than that of the United States, and they have less potential than do we to increase their energy production. They also, like the United States, feel a great sense of unease at their dependence on imported petroleum, and their sense of vulnerability is heightened when they see the degree to which the United States, the leader in the NATO Alliance, relies so heavily on outside sources of crude oil.

The following are our comments on the five specific points you asked us to address:

1. Our treaty obligations, particularly those that relate to mutual security, require the United States to be able to conduct an effective defense of its own interest and to make an effective contribution to the defense of its allies. Heavy dependence on imported oil can create doubts about our ability to sustain prolonged conflicts and assist our allies in an optimum way.

2. It is our view that the current oil import situation impairs our ability to achieve our foreign policy objectives, both economic and political, in ways that are spelled out in this letter. Moreover, the way in which we deal with this situation is widely regarded by other countries as a test of United States leadership and determination to play a constructive role in international relations.

3. The International Energy Agency's oil sharing program, particularly when the full amount of the oil stocks it contemplates is in place, can significantly lessen the impact of potential supply disruptions on us and our allies. Nevertheless, even when the United States strategic Petroleum Reserve is full, it can only delay the impact of a prolonged, severe shortage of oil and is not designed to offer protection against the effects of abrupt price increases. In recognition of this, the members of the International Energy Agency have adopted a separate objective of reducing the group's projected dependence on imported oil to no more than 26 million barrels a day by 1985. Currently, owing in large part to projections of oil imports by the United States on the basis of current policies, achievement of that objective is endangered.

4. Both the Soviet Union and China are net oil exporters. The United States, dependent on far-flung lines of supply and foreign sources for a large percentage of its needs, is at an obvious strategic disadvantage.

5. Our high level of oil import dependence has contributed substantially to a current account deficit that has reduced international confidence in the dollar. This in turn has created unwonted difficulties in achieving the maximum degree of international cooperation to further our objective of promoting a stable, balanced recovery of the world economy from the present severe recession.

In sum, it is our overall judgment that oil and oil products are being imported into the United States in such quantities and under such circumstances as to threaten to impair the national security of the United States; effective action is required to remedy this situation.

Sincerely,

RICHARD N. COOPER,
Acting Secretary.

POTENTIAL ECONOMIC IMPACTS OF A PARTIAL OIL EMBARGO

U.S. DEPARTMENT OF TRANSPORTATION

OCTOBER 26, 1978.

TABLE OF CONTENTS

SECTION
I Introduction.
II Impacts on GNP.
III Possible Mitigation of Impacts.
IV Impacts on Transportation Modes.
V Impact on Auto Travel Related Industries.
VI Impacts of the 1973-74 Embargo.

APPENDIX A—AVAILABILITY OF PETROLEUM STOCKS

SECTION I—INTRODUCTION

An embargo is assumed that cuts off 3 million barrels of imported oil per day for a six-month period, accounting for approximately 15.7 percent of current consumption.

The economic impacts are examined under two scenarios:

1. Petroleum consumption is reduced 15.7 percent in all sectors of the economy.

2. All the reduction of 3 million barrels per day is concentrated in personal auto use.

Neither of these scenarios represents an optimum allocation of petroleum products; they reflect a pessimistic forecast of the economic impact of two extreme allocation policies. The impacts could probably be reduced by an improved allocation policy; drawdown of stocks of petroleum products and substitute fuels; increases in domestic production of fuels; and further conservation. However, it should be remembered that it is difficult to change institutional patterns of energy consumption, production and distribution in the short term, especially without warning and careful advance planning. Therefore, the results presented here may be realistic for a disruptive period following a sudden embargo.

Background information on trends in the consumption of petroleum products and other fuels, domestic production of oil, and oil imports is presented in Table 1. It may be noted that total energy consumption has been growing somewhat slower than real GNP; however, based on data for the first five months of 1978, total energy consumption may grow at about the same rate as GNP in 1978. The consumption of petroleum products has been growing as fast or faster than the GNP for several years (reflecting a sharp decrease in the production of natural gas while coal production has kept pace with GNP growth) but has slowed in 1978. Oil imports have been increasing dramatically until 1978 as a result of a sharp decline in domestic production of oil. However, imports of oil have declined in 1978 largely reflecting the increase in domestic supply from Alaska. In fact, for the first six months of 1978 crude oil imports declined 14 percent, compared to the same six months a year earlier.

TABLE 1. CONSUMPTION OF PETROLEUM PRODUCTS BY SECTOR AND SELECTED ENERGY INDEXES

CATEGORY	1973	1974	1975	1976	1977	Estimated 1978	1979	78:4-79:1
Thousands of Barrels Per Day								
Industrial[a]	3145	3098	2958	3182	3383	3444	3638	3541
Residential and Commercial	3500	3207	3018	3301	3502	3553	3751	3652
Transportation[b]	9131	8881	8957	9430	9746	9907	10162	10035
Electric Utilities	1532	1467	1389	1520	1709	1803	1847	1825
Total	17308	16653	16322	17443	18350	18707	19398	19053
Oil Imports (crude and products)	6256	6112	6056	7313	8744	7938[c]	—	—
Indexes: 1973 = 100								
Real GNP (Constant 1972 dols.)	100.0	98.6	97.4	103.2	108.3	112.7	117.7	—
Energy Consumption								
Total Energy	100.0	97.5	94.7	98.8	101.8	106.1	—	—
Petroleum Products	100.0	96.2	94.3	100.8	106.0	108.1	112.1	—
Coal	100.0	97.5	96.6	101.5	106.3	—	—	—
Natural Gas	100.0	96.5	88.6	90.4	87.1	—	—	—
Energy Supply								
Crude Oil, Domestic Production	100.0	95.3	91.0	88.3	88.8	85.2	—	—
Oil Imports (crude and products)	100.0	97.7	96.8	116.9	139.8	126.9[d]	—	—

[a] Includes agriculture, mining, construction, and manufacturing.

[b] Includes military operations.

[c] Average for January through June 1978.

[d] Based on January through June 1978.

Source: Monthly Energy Review, August 1978, Energy Information Administration, U.S. Department of Energy, Survey of Current Business, various issues, Bureau of Economic Analysis, U.S. Department of Commerce.

SECTION II—IMPACTS ON GNP

A reduction of 15.7 percent in the consumption of petroleum products in all sectors (the first scenario) would tend to reduce GNP in the short term by a like percentage if no conservation was possible, no fuel substitution was possible, no sustained drawdown of petroleum stocks was possible, and the mix of products and services demanded in the economy remained the same. This follows since petroleum products are an essential input, directly or indirectly, to all industries in the economy, and a balanced level of production among intermediate and final products would settle down to the reduced level. The full effects would occur with a one- to two-month lag as fuel in transit and working stocks were depleted.

Freight transportation would be affected by essentially the same percentage as all other sectors of the economy in this worst case assumption. The demand for discretionary travel, however, would probably decline more than the 15.7 percent drop postulated, due to a reduction in incomes and an increase in uncertainty with respect to future incomes. Discretionary travel,[1] largely by auto, is estimated to account for about 12 percent of total petroleum consumption. If this travel is cut voluntarily by 33 percent (due to income declines) which seems reasonable, then petroleum products would be freed up for use elsewhere in the economy, resulting in a reduction of only 13.4 percent in the remainder of the economy.

Some conservation would be possible in industry, transportation (in addition to discretionary travel), and commercial use without reducing output or economic activity. Households might be persuaded to reduce consumption for space heating and other uses. It is estimated that these sectors could absorb on the average a 5 percent decrease in consumption, without decreasing output. Therefore, an 8.4 percent reduction in output is estimated to occur in all sectors, except those associated with discretionary auto driving, increasing to this level over a one to two month period.

A best estimate is an 8.4 percent reduction in the GNP over a six-month period for the scenario under which a 15.7 percent drop in oil consumption is assumed without any formal allocation system or drawing down of petroleum industry stocks of oil and other fuels. Again, it should be pointed out that this is a pessimistic forecast, and the results could possibly be mitigated through some of the steps discussed in the next section.

The second scenario under which all of the reduction would be concentrated in personal auto would mean a 52 percent reduction in auto usage, but only about a 1.2 percent reduction in GNP over the six-month period. Even if all discretionary driving is eliminated, a 20 percent reduction in commutation and business use would be needed to accommodate the 3 million barrel per day reduction in petroleum demand. The effect on the tourist and recreational industry would be major. Hotels and motels would probably lose over 25 percent of their business. Auto service stations and repair shops would probably suffer revenue losses of up to 50 percent. The impact on auto sales could be severe in the short term, but the losses would probably be largely recouped later. The effect on GNP is estimated at about a 1.2 percent annual rate over the six-month period (see Section V). This GNP loss would affect some establishments more severely than others. Lodging and eating establishments located in tourist areas would suffer extensive losses while establishments in business areas would realize only minor losses.

SECTION III—POSSIBLE MITIGATION OF IMPACTS

The impacts under the first scenario could probably be reduced by one or more of several actions that might be feasible:

1. drawdown of stocks of petroleum products;
2. drawdown of stocks of other fuels to substitute for petroleum use;
3. higher conservation in the residential and commercial sector for space heating and cooling; and
4. higher reduction in consumption in energy intensive industries.

Drawdown of petroleum industry and user stocks (crude and products) might be feasible up to 200 million barrels. This would be from safety and cyclical stocks estimated at 600 million barrels normally.[1] However, a large drawdown of these stocks would inevitably lead to imbalances in specific locations. Over recent years, including the 1973-74 embargo period, the maximum drawdown in these stocks over a few-months period has been around 200 million barrels. To achieve this much drawdown by design would probably entail very close scheduling in the transportation and distribution system. A drawdown of this amount would significantly mitigate the necessary reduction in petroleum consumption across-the-board. Under the 15.7 percent across-the-board reduction in consumption scenario, the GNP impact might be reduced to about 2 percent (from the 8.4 percent best estimate without a drawdown of petroleum stocks, see Section II).

Scenario 2 concentrates the reduction in petroleum use in automobile travel for both discretionary and business uses. Under this scenario the GNP would be reduced by about 1 percent from the impacts on auto related industries (see Section V). If conservation in other sectors of the economy and industry stock drawdown were encouraged, the GNP impacts could be reduced and the cutbacks in discretionary driving could be brought down to 46 percent from 100 percent and the cutbacks in business travel would be limited to the 5 percent savings from conservation. Table 2 presents a summary of the effects of various mitigation efforts on each Scenario.

[1] See Appendix A.

TABLE 2.—*Mitigation of Impacts on Gross National Product 1978:4-1979:1*

[Barrels per day in thousands]

	Scenario 1 across-the-board reduction		Scenario 2 personal auto reduction only	
	Barrels per day	Percent[1]	Barrels per day	Percent[2]
Total petroleum cutback	3,000	15.7	3,000	
Mitigation of GNP reduction				
Demand reduction from discretionary travel	762		2,308	
Demand reduction required from other sectors	2,238	13.4	692	
Demand reduction from business travel			692	1.18
Demand reduction from conservation	837		837	
Shortfall	1,401	8.4	0	
Drawdown from industry stocks	1,111		1,111	
Shortfall	290	1.7	0	
Excess supply available from conservation and stock drawdown	0		[3]1,948	

[1] Reduction in total GNP after each mitigation effort.
[2] Reduction in total GNP.
[3] In Scenario 2 the petroleum available from industry stock drawdown and conservation could be used to eliminate the reduction in business travel and cut the reduction in discretionary travel to 1052 TBD (46 percent of discretionary travel demand) and thus the GNP impact could be reduced to about 0.5 percent.

[1] Discretionary travel accounts for about 40 percent of all auto vehicle miles. It includes all social and recreational driving and about a third of family business driving. These estimates are reported in the National Personal Transportation Study, *Household Travel in the United States*, Report No. 7, December 1972.

Drawdown of natural gas and coal stocks might also be feasible and, to the extent that these fuels could be substituted for oil, would reduce the impacts further.

It should be kept in mind that a drawdown of either stocks of petroleum or other fuels would have the effect of spreading the impact over a longer time frame than the six-month period and at a lower rate of impact. These stocks would need to be replenished after the embargo and the extent to which stock replenishment would affect the economy would be determined by the rate at which supplies would be available after the embargo. In a case where the supply rate required for stock replenishment could be obtained in addition to the supply rate for normal petroleum demand, the impacts would not carry over into the post-embargo period.

In the future the Strategic Petroleum Reserve (SPR) could provide some additional relief. When the reserve is filled, it is designed to satisfy all petroleum requirements above the domestic production for a 125 day period. The current fill is about 35 million barrels. Estimates for the fill by December 1980 range from a base case of 325 million barrels to a maximum achievable under an accelerated program of 465 million barrels. The long range goal is 1 billion barrels. As the current supply would account for less than two weeks of the shortfall assumed in this study, the SPR is not considered in the analysis.

Higher cut-backs in residential and commercial consumption for space heating and other uses would probably be possible only with stringent rationing and controls over consumption since a significant reduction has already been postulated (13.4 percent under the assumptions of the first scenario).

Higher cut-backs in energy intensive industries probably do not hold much promise since these are generally basic industries upon which the rest of the economy is dependent. Some higher cut-back might be possible, by depleting the inventories of the products of these industries, for a limited time and still maintain balanced production in the remainder of the economy.

SECTION IV—IMPACTS ON TRANSPORTATION MODES

A cutoff of a specified amount of present crude oil and/or petroleum product imports would affect transportation modes in two ways, as transporters of the crude oil and petroleum products and as consumers of petroleum products. The estimated consumption of petroleum products by mode is presented in Table 3.

TABLE 3. - ESTIMATED 1978 TRANSPORTATION CONSUMPTION OF PETROLEUM PRODUCTS

	Thousands of Barrels Per Day					
	Petroleum Products	Gasoline	Diesel Fuel	Residual Oil	Jet Fuel	Av. Gas
All Modes	9469.2	7195.0	1197.8	281.4	963.3	31.6
Railroads	283.0		283.0			
Water Modes	543.5	55.8	112.1	281.4		
Domestic Freight	218.3		45.0	173.3		
International Freight	236.1		32.0	204.1		
Commercial Fishing Boats	38.7	3.6	35.1			
Recreation Boats	50.4	46.4	4.0			
Highway Total	7935.5	7145.0	790.5			
Auto (and personal truck)	5770.8	5770.8				
Truck	2091.5	1345.2	741.6			
For Hire						
Local	86.1	47.7	38.4			
Intercity	473.6	86.9	406.7			
Private						
Local Freight	235.9	231.2	4.7			
Intercity Freight	313.9	112.6	201.3			
Non-Freight	912.5	800.2	112.3			
Government	97.1	91.3	5.8			
Buses						
Intercity	18.4	.7	17.7			
Transit	31.4	.3	31.1			
Private	23.4	23.3	.1			
School	18.8	18.7	.1			
Other	4.3	4.3	0.0			
Pipelines	12.3*		12.3*			
Aviation	894.9				863.3	31.6
Commercial Aviation	847.1				844.0	3.1
General Aviation	47.8				19.3	28.5

*1972 data; most energy consumed by pipelines is natural gas or electricity.

Sources: Monthly Energy Review, U.S. Department of Energy, August 1978; Highway Statistics, U.S. Department of Transportation, various issues; Monthly Report of Gasoline Sales, Ethyl Corporation various issues, Yearbook of Railroad Facts, 1977 and preliminary 1978 edition, Association of American Railroads; Aviation Forecasts, 1978-1979 and 1979-1980 preliminary edition, FAA, U.S. Department of Transportation; and Energy Consumption by Transportation Mode, report submitted by Jack Faucett Associates, May 1973 to OST, U.S. Department of Transportation.

11

TRANSPORTATION MODES AS TRANSPORTERS OF CRUDE OIL AND PETROLEUM PRODUCTS

Forced curtailments in imports of crude oils and/or petroleum products would reduce the quantities of these products that have to be transported. Some highlights of the kinds of impacts that might be expected on different modes are as follows:

International Water

Virtually all crude oil and petroleum product imports except those from Canada enter the U.S. via water. Thus a 50 percent cutback in imports would cause a comparable percentage reduction in the tonnage output required. Most crude oil is carried on foreign flag vessels. These may be owned by U.S. based multinational corporations. It seems likely that the reductions would not be made proportionately by port of entry but adjusted so that supplies of crude to refineries would be kept in balance and so that the requirements for further transport of the refined products could be minimized. Specifically this would mean that a higher percentage of the imports would be focused on PAD I (Northeast-Atlantic Coast Area) since this region's refineries receive over 90% of their crude from foreign sources.

Domestic Water

The domestic water carriers provide significant service in the transportation of petroleum products and also crude oil. It is expected that the transportation requirements placed on the transportation of crude oil and petroleum products would be reduced somewhat less than the reduction in overall petroleum product demands. For example, transportation requirements for Alaskan oil would not be reduced and could be expanded if more of the oil was shipped over water to Gulf and East Coast ports. Also for petroleum products most production based on domestic oil is located away from consumption areas while for imports the refineries which use this crude are located close to consumption areas.

In 1976 about 60 percent of crude oil and petroleum product ton miles in

domestic water were handled by private carriers. In these cases most of the economic impacts of the loss of business in transporting these products would be part of the total impact on the petroleum companies which own most of the vessels. The remaining 40 percent are provided by for-hire carriers. They are likely to be specialized carriers and therefore could individually be singificantly impacted by curtailed business.

Pipelines

Pipelines may be divided along the line of the products carried, crude oil vs. petroleum products although many companies are engaged in carrying both these goods though in separate lines. The pipelines serve to carry crude oil from coastal import landing areas to inland refinery locations and from areas of excess domestic crude production to other areas for refining. Individual pipelines which carry imported crude might therfore face a reduction in throughput while those which transport domestic oil might not.

Petroleum product flows would also be cut as a result of the decreased imports. Overall pipeline flow decreases might approximate the overall 15.7 percent average decline in petroleum product consumption.

Trucking

Trucks are involved in the final delivery of most motor fuels and distillate fuels for heating. These companies would, therefore suffer a loss in business that might be proportional to the overall percentage reduction in petroleum product consumption if the reduction is made proportionally across the board. The total effect on the industry would be similar under both scenarios, as in each case the demand reduction is 3 million barrels per day. However, scenario 2 concentrates this reduction in auto use (52 percent reduction in scenario 2 vs. 21 percent in scenario 1) and thus, those industry segments that typically deliver motor fuels would suffer greater losses than other segments of the trucking industry. Carrying these products apparently accounted for about 8 percent of trucking intercity ton-miles in 1972.

TRANSPORTATION AS USERS OF PETROLEUM PRODUCTS

As users of petroleum products in a partial embargo situation, transportation modes will be balancing reduced demands for their services vs. reduced fuel availabilities to see whether they will be able to provide the demanded services with the available fuels or whether lack of fuels might constrain their output. The ability to reduce fuel use without affecting output is likely to differ significantly across the modes, for instance those that tend to operate at low load factors (as most of the passenger modes do) should be able through rescheduling to accomodate the desired pasenger travel, though at some inconvenience due to the rescheduling with significantly lower energy consumption. This can cause other disruptions such as employee layoffs.

Among the freight modes the load factors are higher, and the scheduling problems more complicated (especially for trucks) and there could, therefore, be less opportunity for retaining output levels while reducing energy consumption.

The last section of this report which reviews the impacts of the 1973-1974 embargo may also be helpful to give a feel for the type of modal impacts that might be expected.

SECTION V—IMPACT ON AUTO TRAVEL RELATED INDUSTRIES

The impact on GNP and employment would be minimized by concentrating the reduction in oil consumption more heavily in personal auto. However, this would have very serious impacts on a number of auto travel related industries.

In Scenario 1 GNP is reduced by $10.2 billion in auto related industries or approximately 0.49 percent of total GNP measured at annual rates. The largest reduction in terms of total GNP is in auto repair services where GNP is reduced by $2.5 billion (annual rate). The reduction is about 21 percent of the Gross Product Originating (GPO)[1] of this sector. Gasoline service stations and eating and drinking places cut GNP by $1.9 billion and $1.7 billion respectively.

[1] Gross Product Originating (GPO) is the portion of GNP contributed by each sector of the economy. The sum of GPO across all sectors is GNP.

Scenario 2 results in $24.8 billion, or 1.18 percent, cut in GNP at annual rates. The actual dollar reduction would be approximately half the reduction of the annual rate as shown in Table 4. Auto repair services are again the most heavily affected sector cutting total GNP by $6.2 billion. Reduced activity in gasoline service stations reduce GNP by $4.6 billion. The hotel and lodging industry derives about thirty percent of its revenue from pleasure as opposed to business and convention customers. Of these approximately 80 percent arrive by private auto. Only 40 percent of the business and convention customers arrive at their lodging via private auto. This translates into a GNP reduction of $3.5 billion from a 100 percent cutback in discretionary auto use and a 20 percent cutback in other auto use. The food and beverage industries also rely heavily on tourist purchases. In 1970 about 15 percent of food and beverages purchased away from home were purchased more than 50 miles from home. Of all trips of 100 miles or more made in 1976, the private auto was the primary mode for 72.3 percent of them. The cutback in auto use reduces the contribution to GNP from the food and beverage industry by about 7 percent of $4.4 billion.

The impacts on the auto related industries are based on driving cutbacks of 21 percent in Scenario 1 and 52 percent in Scenario 2. Fuel conservation and industry stock drawdown could reduce the GNP impacts somewhat. In Scenario 1, this available fuel would probably be employed in the manufacturing sector and would have only a minor effect on total GNP reductions in the auto related industries. However, in Scenario 2, this fuel would be available to auto users and could cut the GNP impact by more than 50 percent.

TABLE 4.—*Estimated Reduction in Gross Product Originating by Sector Resulting From the Impact on Auto Travel Related Industries of a Partial Oil Embargo*

[Annual Rates]

Sector	1978 GPO by industry Millions $	Reduction in GPO			
		Scenario 1		Scenario 2	
		Millions $	Percent	Millions $	Percent
Motor vehicle dealers	9,338	934	10.0	1,868	20.0
Other auto and accessory dealers	4,988	1,047	21.0	2,593	52.0
Auto repair services	11,914	2,502	21.0	6,195	52.0
Gasoline service stations	8,820	1,852	21.0	4,586	52.0
Motor vehicle manufacturing	8,339	834	10.0	1,668	20.0
Eating and drinking places	63,233	1,660	2.6	4,391	6.9
Hotels and other lodging places	11,333	1,326	11.7	3,467	30.0
Total		10,161	[1] 0.49	24,786	[1] 1.18

[1] Based on a Gross National Product of $2,095 billion.

Scenario 1: 21 percent reduction in overall auto use; 33 percent reduction in the use of auto for discretionary auto travel; and a 13.4 percent reduction in the use of auto for all other purposes.

Scenario 2: 52 reduction in overall auto use; 100 percent reduction in use of auto for discretionary auto travel; and a 20 percent reduction in the use of auto for all other purposes.

Other impacts not considered could include the effect on construction of vacation homes and real estate values in recreational developments. These impacts, along with the impact on new car sales, could be dramatic initially but probably could be recouped later if there were confidence that the embargo would be lifted. It should also be noted that some establishments will be impacted more than others and the revenues for some resort hotels could be reduced by as much as 80 percent.

SECTION VI—IMPACTS OF THE 1973-74 EMBARGO

The oil embargo, which was imposed October 18, 1973, by the Organization of Petroleum Exporting Countries, remained in effect until March 18, 1974. By the first quarter of 1974, there was an estimated shortfall of 3.1 million barrels per day in petroleum products, or 15.1 percent of total anticipated consumption.

Table 5 presents data measuring the imports of petroleum products just prior to and during the embargo. During the months just prior to the embargo and before the embargo impacted on actual deliveries, imports were running approximately 2.1 million barrels per day above the previous year. As the embargo took effect, imports fell to approximately 1 million barrels below the same month a year earlier.

TABLE 5.—*U.S. petroleum imports*

(thousand barrels per day)

Date	Total imports	Total one year before	Change from previous year
Aug. 24, 1973	5,767	3,649	2,118
Sept. 21, 1973	6,291	4,170	2,121
Oct. 19, 1973	6,720	4,594	2,126
Nov. 16, 1973	6,639	4,531	2,108
Feb. 1, 1974	5,200	6,538	- 1,338
Feb. 8, 1974	4,446	5,353	- 907
Feb. 15, 1974	4,578	5,707	- 1,129
Feb. 22, 1974	4,933	5,900	- 967
Mar. 1, 1974	5,211	6,354	- 1,143
Mar. 22, 1974	5,502	6,627	- 1,125

Source: *Oil and Gas Journal.*

Federal policies, aided by market forces, were designed to minimize the impact of the embargo on the Gross National Product. This is illustrated in Table 6 by estimates of the extent of the shortfall in required energy experienced by major segments of the economy.

TABLE 6.—*The distribution of embargo oil shortfall on the sectors of the economy*

Household and commercial	17%
Industrial	5%
Transportation	17%
All sectors	15%

Source: *The Economic Impacts of an Interruption in United States Petroleum Imports: 1975-2000.* Office of Naval Research, Department of the Navy, November 1974.

The Federal Energy Administration estimated that the overall impact of the embargo on the economy resulted in a reduction in projected GNP of 1.2 to 2.5 percent, below its anticipated level.

As noted in Table 6, the embargo had a substantial impact on both commercial and non-commercial transportation. The following are some indications of the extent of this impact.

Automobile

During the embargo the consumption of gasoline in autos decreased by approximately 8 percent, as a result of the higher prices and the inconvenience of queuing to get gasoline when compared to the previous years consumption. Had consumption continued to grow at its previous rate, auto fuel use would have been approximately 14 percent higher than the embargo levels. Based on a survey conducted in the summer of 1974, in Portland, Oregon, an estimate was made of the effect of the embargo on the behavior of families with automobiles. Table 7 identifies the extent to which these families changed their modal use pattern due to the embargo.

TABLE 7.—*Effect of the 1973-74 embargo on the use of autos by urban families in Portland, Oregon*

Type of change	Percent of families
No change	52
Switch to other modes	26
Reduced auto travel	18
Miscellaneous mode changes	4
	100

Source: Boris W. Becker, et al., "Behavior of Car Owners During the Gasoline Shortage," *Traffic Quarterly*, July 1976.

The decline in the use of autos severely impacted on the auto industry. General Motors' sales dropped by 5.6 percent, Ford's fell by 13.8 percent and Chrysler declined by 19 percent during the first ten days of November 1973. In December, there were week-long shutdowns of 16 GM plants, while Chrysler closed 7 of its plants in January, putting more than 38,000 employees out of work.

The decline in the use of autos is also reflected in the reduced sales of motor gasoline. As indicated in Table 8 sales in the first quarter of 1974 were approximately 7.9 percent below the same quarter a year earlier. While sales improved through the rest of the year, they did not exceed the 1973 levels until the third quarter of 1974.

TABLE 8.—*Sales of motor gasoline*

Quarter	1973	1974	Percent change 1973-74
	(Millions of gallons)		
I	22,945	21,129	-7.9
II	24,931	24,403	-2.1
III	25,709	25,296	-1.6
IV	24,120	24,413	+1.2
Total	97,705	95,241	-2.5

Source: *Yearly Report of Gasoline Sales.* Ethyl Corporation, 1974.

Trucking

Trucking was also severely affected by the embargo. This was illustrated by a strike of owner-operators which began on January 31, 1974, due to several circumstances resulting from the embargo, including the lowering of the speed limit to 55 miles per hour, the sharp rise in the price of fuel, and the general scarcity of fuel which forced many drivers to chase from truck stop to truck stop to obtain fuel. Approximately 100,000 workers were reportedly laid off due to the truckers' strike.

Due to the increase in the cost of fuel between May 1973 and February 1974, and partially in reaction to the independent operators' stoppage, the ICC allowed a 6 percent fuel surcharge for general commodity regulated carriers. This surcharge was strongly contested by many of the industries which rely on trucking for the movement of their manufactured products.

Railroad

The use of passenger service and freight service increased during the embargo. Commodities transported by rail reached a record 845 billion tonmiles in 1973, or nearly 9 percent over the previous record. The increased use of rail obviously resulted in higher operating revenues, though the more than 50 percent increase in fuel prices from the previous year severely impacted on the financial position of the railroads. In February of 1974, the Interstate Commerce Commission permitted interim increases in rates of 4 percent to offset the increased cost of fuel and wages.

The availability of operating fuel was also a problem for railroads. While there was an increase in the use of rail service, this industry was limited to 100 percent of current needs for fuel consumption for the movement of fuel and passengers, and 110 percent of the 1972 level for the movement of other commodities.

Maritime Industry

Even though bunker oil was not subject to fuel allocation controls several shipping lines took action to reduce their consumption of bunker oil. Sea-Land Service took four ships out of

service, Sea-Train laid up two ships, while Matson Navigation Co. curtailed service of one vessel. Trans-American Trail and United States Lines reduced the speeds of some of their vessels to conserve on fuel. Energy conservation was also achieved through rationaliztion, which is the procedure by which sailing are spaced on a given trade to maximize the utilization of ship capacity.

Airlines

Airlines were severely affected by the embargo. Initially, the mandatory allocation program limited the fuel consumption of airlines to their 1972 levels, which was approximately 10 percent below requirements. To meet this situation, airlines competing in the same markets agreed on reduction in capacity. American, TWA, and United agreed to reduce capacity in 20 major markets through the cancellation of 82 flights in 15 markets and down-grading equipment in the remaining areas.

As the embargo continued and worsened, the President called for the further reductions in the consumption of fuel by air service. Table 9 identifies the extent of the reductions requested below 1972 consumption levels.

TABLE 9.—*Requested reduction in fuel consumption below 1972 levels*

Type of Air Service	Percent Reduction
Domestic Trunk	15
Local Service Carriers	10
International Carriers	15
Commercial and Industrial Users	10
Business and Executive Users	20
Personal, Pleasure, and Instructional	30

Source: Unpublished memoranda, Transportation Systems, Center, U.S. Department of Transportation, May 21, 1975.

By December, 400 daily domestic flights were cut from the original 13,800 scheduled.

Layoffs were widespread in the industry by January 7, 1974. Table 10 identifies the extent of the employment cuts.

TABLE 10.—*Layoffs by selected domestic carriers due to the embargo as of January 7, 1974*

Airlines	Number of Employees
Eastern	3,800
TWA	3,300
American	3,100
Pan American	1,000
Continential	732
Frontier	550
United	970
Northwest	129

Source: Unpublished memoranda, Transportation Systems Center, U.S. Department of Transporation, May 21, 1975.

Paul R. Ignatius, president of the Air Transportations Association of America described the plight of the airlines during the embargo. He noted that from Novemeber 1973 until the fuel allocation program took full effect, the airlines had furlough 15,000 employees, cancel ¡2,200 daily departures and ground 125 aircraft.

Fuel costs for domestic airlines, which rose only 13 percent in the five year period from 1967 to 1972, jumped approximately 20 percent from December 1973 to January 1974 and by March were 47 percent higher than a year earlier.

APPENDIX A—AVAILABILITY OF PETROLEUM STOCKS

Since 1972 the petroleum industry has normally maintained petroleum stocks of between 1,000 and 1,225 million barrels.[1] A report prepared[2] for the Department of Energy's Office of Strategic Petroleum Reserves (SPRO) estimates that for April 1977 stocks averaged 1,120 million barrels and were made up as follows:

Operating Inventory:	
Safety Stock	233 million barrels
Cycle Stock	391 million barrels
Seasonal Inventory:	
Seasonal Stock	90 million barrels
Storage Tank Bottoms	104 million barrels
Unavailable Inventory:	
Equipment Fill	1 million barrels
Pipeline Fill	267 million barrels
In transit (non-pipeline	35 million barrels
Total	1,121 million barrels

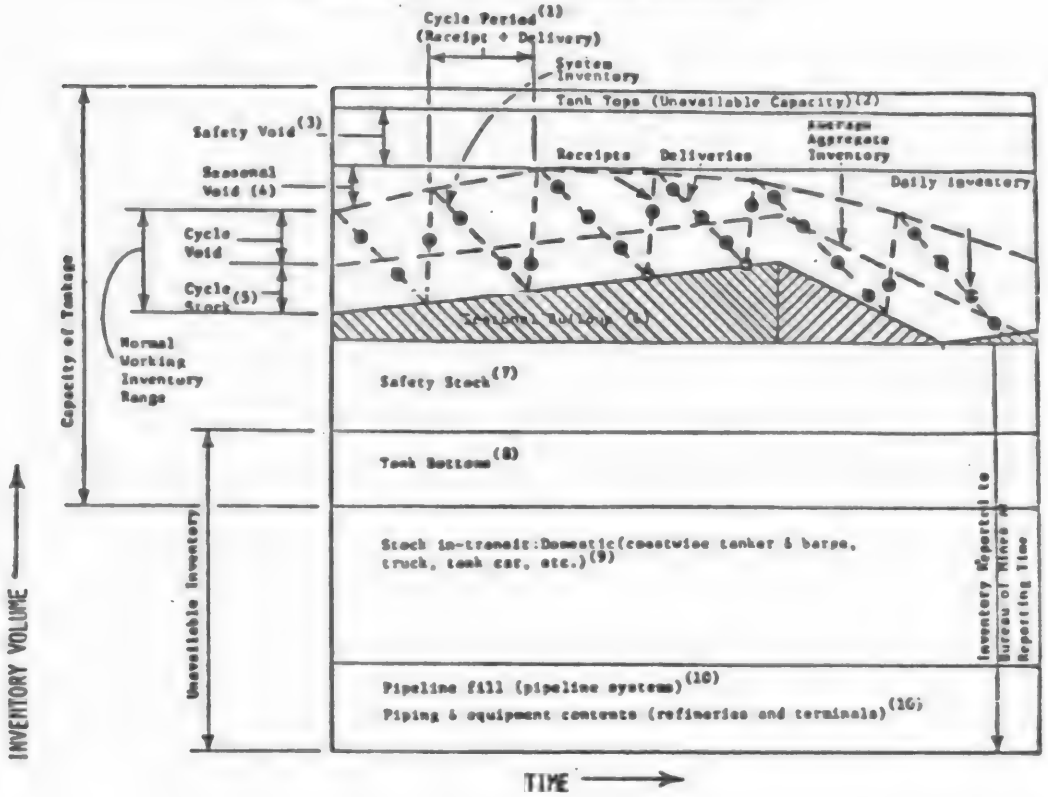
Exhibit 1 schematically illustrates the volume of the petroleum industry and shows how crude and oil products fill that volume over time.

[1] Per Bureau of Mines Mineral Industry Surveys.

[2] Evaluation Research Corporation, *Inventory Management in the Petroleum Industry*, October 1977.

EXHIBIT 1

GENERALIZED PETROLEUM INVENTORY DIAGRAM FOR SEASONALLY INFLUENCED STOCK



NOTES/DEFINITIONS

1. Cycle Period - Receipt and delivery cycle time period - function of transportation mode (e.g., barge, tanker, pipeline).
2. Tank Tops - To allow for thermal expansion and safety margin against spillage.
3. Safety Void - To allow for early resupply or delays in transfers from tankage.
4. Seasonal Void - To provide room to hold seasonal buildup.
5. Cycle Stock - Inventory held as a result of the interaction between receipt and delivery patterns.
6. Seasonal Buildup - To accumulate the product which exceeds resupply capability during the peak demand period.
7. Safety Stock - To allow for delays in receipts, larger than anticipated demand, etc.
8. Tank Bottoms - Cannot be withdrawn from tankage under normal operating conditions.
9. In-transit - Resupply stock in custody of shippers.
10. Pipe & Equipment Fill - To assure continuous processing and/or handling.

As shown above, only part of the stocks are available. Equipment and pipeline fill and tank bottoms are not normally available. Also, over a period of a year the seasonal inventory will change, particularly for products such as heating oil and gasoline. Seasonal stocking of petroleum products changes significantly, however, the total stock of all crude and products changes less significantly due to season changes. From June 1976 through May 1977 total oil stocks fluctuated by about 153 million barrels and as that change occurred between October and February, it can probably be assumed that this was in part a seasonal change over the heating season. (However, since the winter of 1976-77 was abnormally cold, not all this difference can be assigned to the seasonal inventory.)

The petroleum operating inventory was stated by the earlier referenced SPRO report to be made up of the cycle stock and safety stock. These two components of the total stock are assumed to make up the oil industry's operating inventory and are estimated to be about 600 million barrels.

If, in fact, the oil industry's safety stock is part of its operating inventory, the effect of shortages could be felt very soon after the beginning of an embargo were it not for the practice in the oil industry of operators borrowing and lending to each other. It is this cooperative practice that allows safety stocks to be part of operating inventory. Nonetheless, if there were an embargo, spot shortages could probably begin occurring very soon in particular geographic areas, while other areas might even have surpluses. However, as the embargo continued, spot shortages would become more and more common until the safety and cycle inventories were completely depleted.

While spot shortages would probably be felt early, they would probably not become a general problem until the 230 million barrel safety reserve was depleted.

On the issue of stock drawdown the experience of the 1973-74 embargo is interesting. That embargo lasted from October 18, 1973 to March 18, 1974—five months.

A review of Bureau of Mines data from 1972 to 1978 on petroleum stocks suggests that during the year (September 1973 through August 1974) that contained the 1973-74 oil embargo, aggregate petroleum stocks fluctuated less than they did during the same September to August period in 1972-73 and 1976-77. In fact, aggregate petroleum stocks were drawn down nearly three times more from October 1972 to March 1973 (231 million barrels) than they were during the October 1973 to March 1974 embargo (88 million barrels). At the aggregate level stocks were not used abnormally during the 1973-74 embargo and, in fact, were used less than they often have been during "normal" (non-embargo) times. The availability of stocks appears to have played no important role in mitigating the effects of the 1973-74 embargo.

7

SEPTEMBER 11, 1978

Memorandum for Robert Mundheim, Department of Treasury

From: Charles L. Schultze

Subject: Oil Import Investigation Under Section 232(b) of The Trade Expansion Act of 1962 as Amended

We have examined the relation between U.S. imports of petroleum and petroleum products and U.S. national security pursuant to your investigation under Section 232(b) of The Trade Expansion Act of 1962 as amended, 19 U.S.C. 1962(b). We find that the current level of imports significantly impairs our economic welfare and thereby threatens our national security in two ways:

(1) Interruptions in our oil supply comparable to the embargo of 1973-74 are still possible and would impose serious economic losses if they occur.

(2) Even in the absence of interruptions of supply, continued high levels of U.S. imports threaten to induce substantial increases in the world price of oil in the 1980s exposing the United States to the risk of severe economic harm in the future.

These dangers can be minimized without causing severe economic dislocation only by measures which promise to reduce the dependence of the United States on foreign sources of oil.

The U.S. economy has become steadily more dependent on oil imports over time. In 1960, imports satisfied 19 percent of total petroleum product consumption. By 1973, that fraction had grown to 36 percent. In 1977, it stood at 47 percent. In the absence of effective actions to hold down the level of oil imports, this fraction could rise further in the years to come.

Such high oil import levels have made, and continue to make, the United States vulnerable to interruptions in supply. This vulnerability was dramatically demonstrated by the 5-month Arab oil embargo of 1973-74. The economic impacts of that embargo and the oil price rise that accompanied it have been intensively studied by researchers both within and outside the government. Estimates of those effects are shown below. We have carefully reviewed these studies and find that the estimates span the probable range of actual effects on the economy.

	Average percent reduction in real GNP, 1974
Perry (in Edward R. Fried and Charles L. Schultze, eds., *Higher Oil Prices and the World Economy* (1975), pp. 96-97:	
Michigan model (percent)	1.6
Federal Reserve Board model (percent)	2.0
DRI (*DRI November 1975 Review*) (percent)	2.3

The range of percentage GNP loss (1.6-2.3 percent) implies an increase in the 1974 unemployment rate of between 0.5 percent and 0.8 percent (400,000-730,000 jobs). The oil price increase is estimated to have increased the level of prices by 1.3 percent-2.9 percent in 1974—accounting, therefore, for one-third to one-half of the increase in inflation that year. These are extremely serious economic effects by any standard of comparison.

A repeat of the 1973-74 embargo could have even more disruptive effects today. U.S. dependence on oil exports from Arab members of OPEC (OAPEC) has grown. In 1973, OAPEC supplied 22 percent of U.S. oil imports, directly or indirectly through foreign refiners. By 1977, that fraction had risen to over 40 percent.

On the other hand, after 1973, an international oil sharing program was formed under the auspices of the International Energy Agency. The program is designed to distribute any shortfall resulting from an embargo equitably among the IEA members and thereby reduce the incentive of individual nations to bid up world oil prices unnecessarily. Whether the program would actually succeed in this endeavor is not certain.

We have estimated the economic impacts that could be expected if another embargo were to occur in the future. Specifically, we have investigated the effects of a 6-month embargo starting on January 1, 1980. To parallel the 1973-74 experience, we have assumed a 25 percent cutback of OAPEC production and applied the IEA oil-sharing formula—assuming it is fully effective—to determine a net cutback to the United States (2.1 million barrels/day). Because the strategic oil reserve will contain only a small fraction of its eventual size by that time, we have assumed that no part of the oil cutback is offset through distribution of oil held in the reserve.

Since the economic impacts are highly sensitive to a number of macroeconomic variables, we specified an "optimistic" and a "pessimistic" case to generate a plausible range of impacts. *The optimistic case represents the absolute minimum set of impacts that we can reasonably foresee from an*

embargo of this size and duration. It assumes an expansive monetary policy, no change in business or consumer confidence, a relatively large world demand response to changes in the world price of oil (a price elasticity of demand of −0.2), and, at the end of the embargo, a return of world oil prices to pre-embargo levels.

The pessimistic case represents a set of maximum impacts—it assumes a replication of the tight monetary policy which occurred during the 1973-74 embargo, a substantial loss in business and consumer confidence (like the 1973-74 experience), a relatively inelastic demand for world oil (elasticity of −0.1) and a permanent 20 percent increase in the world oil price after the embargo. Each case assumes that a domestic oil allocation program and price controls are in place as in 1973-74 and that a portion of the cutback is offset by reductions in privately-held oil stockpiles and industrial conversions to coal and natural gas.

The impact estimate for each case are given below:

	Optimistic	Pessimistic
Real GNP:		
Percent change in 1980	−0.8	−3.5
Percent change in 1981	−1.5	−7.0
Cumulative dollar loss through 1984 (billions of 1978 dollars)	$80	$410
Labor Market Effects:		
Change in unemployment rate, 1980	0.2	0.9
Change in unemployment rate, 1981	0.6	2.8
Change in unemployed, 1981	200,000	900,000
Change in unemployed, 1981	550,000	2,800,000
Change in employment rate, 1980	−250,000	−1,100,000
Change in employment rate, 1981	−825,000	−4,200,000
Inflation:		
Percent change in consumer price index (CPI), 1980	1.0	
Percent change in CPI, 1981	1.0	

In both cases, the effects grow over time because of the lagged responses in the economy to both the shortfall and and loss in domestic purchasing power induced by the rise in the world oil price during the period of the embargo. Though the estimated range of impacts is wide, even the favorable impacts are nevertheless quite serious. Any event which could alone induce an increase in unemployment of *at least* 750,000 persons in two years poses serious hardships. Moreover, the fabric of our economy could be threatened if the pessimistic case of nearly 3 million in additional unemployment were realized.

The impacts of any future supply interruption would, as in the case of the 1973-74 experience, be felt disproportionately in different regions and industries. The effects would be particularly severe in the northwestern and northeastern parts of the country where over three-fourths of all crude petroleum demand is met from imports.

Because petroleum products are of critical importance in virtually every major industry, the industrial effects would be spread more evenly. So long as consumption in industry can be maintained in an embargo period by reducing available inventories and conservation in other sectors, production and employment impacts can be alleviated. The 1973-74 experience, however, indicates that this period of protection is short. Furthermore, the agricultural, construction, chemicals, and transportation sectors are especially vulnerable because of their far greater than average dependence on petroleum and their inability to substitute other sources of energy for petroleum. Finally, restrictions of activity in the transportation industry, in particular, affect all other industries almost immediately.

The supply of petroleum is crucial to the overall strength of the economy beyond its effects on needed industrial inputs. Roughly one-third of all petroleum is consumed by households, of which nearly three-fourths is used by gasoline. A major conservation effort directed at household gasoline use to enhance industrial supplies of petroleum would directly affect demand for new cars, recreational goods, and tourist services. The 1973-74 oil embargo was largely responsible for the 10 percent decline in auto sales that coincided with the embargo and which precipitated large employment declines in related industries. Similar effects could be expected in the event of another supply interruption of comparable size.

Economic Dangers Other Than Supply Interruptions. Even in the absence of any risks of supply interruptions, continued growth in the level of U.S. oil imports poses severe dangers to our economic health. Combined with expected increases in import demands by other nations, growth in U.S. oil imports could strain available world supplies sometime during the 1980s. The resulting increases in the price of world oil which could result could have substantial economic impacts. At the current level of imports, each $1.00 increase in the real price of world oil increases U.S. oil costs by $4.5 billion (in 1978 dollars) and domestic inflation by 0.2 percent. The increase in the balance of trade deficit, adjusted for a partial offsetting increase in U.S. exports to OPEC, is estimated at $3.2 billion. By way of comparison, the U.S. balance of trade deficit in 1977 was $31 billion.

Even a modest rise in the real price of world oil, therefore, could have a significant economic impact. The outflow of dollars would reduce domestic purchasing power, force a deterioration in the value of the dollar, and thereby increase domestic inflation (above and beyond the direct effect caused by the rise in world oil prices). The presence of these events would severely hinder the ability of fiscal and monetary authorities to achieve both high levels of employment and price stability. In particular, either a significant decline in employment or increase in the inflation rate endured over a long period of time could upset our social fabric and therby threaten our national security.

Based on our understanding of the law and the evidence as we have examined it, we find that the importation of petroleum at current levels threatens the national security of the United States.

8

U.S. DEPARTMENT OF THE INTERIOR
OFFICE OF THE SOLICITOR,
Washington, D.C., February 12, 1979.

Mr. ROBERT F. MUNDHEIM,
General Counsel of the Treasury,
Washington, D.C.

DEAR MR. MUNDHEIM: This letter is in response to yours of February 6, 1979. As asked in your letter, we have prepared a revised report on the availability of energy resources from Federal lands. This report is attached. We defer to the views of other agencies on whether the level of imports of petroleum and petroleum products into the United States is such as to threaten national defense or the economy.

Our report indicates that new energy production from Federal lands could not offset an interruption of imported supplies of oil. Oil and coal resources on Federal lands constitute an important source of energy for the future, but the magnitude of these resources is not such that they could fully replace currently imported supplies of oil. Further, our short term ability to increase production of energy resources from Federal lands is limited. Increased diligence recruitment on lessees of Federal oil and coal resources can produce only marginal increases in production. New leasing could be a more significant source of new energy, but the time period between leasing and production is a minimum of 1-2 years for oil and 5 years for coal.

Sincerely yours,

LEO KRULITZ,
Solicitor.

Enclosure.

DEPARTMENT OF TREASURY, SECTION (232(b)) INVESTIGATION

OIL

Production of oil from the public lands[1] has declined in recent years. In 1950, 103.1 million barrels of oil were produced. This figure rose steadily each year, reaching 618.5 million barrels in 1971. Thereafter production began to decline. Geological Survey figures show production of 489.8 million barrels in 1976. Fiscal Year 1978 figures were 477 million barrels. We believe that this figure will continue to decline although the decline should not be so sharp in the near future due to the effects of the Department's program to enforce diligence requirements. Production from public lands as related to total domestic production, while relatively steady, has nevertheless shown a decline from approximately 18.2% in 1972 to 17.5% in 1976 and 16.3% in FY 1978. This decline is attributable in part to the lessening of production on the outer continental shelf (OCS) which was 11.9% of total domestic production in 1972, 10.8% in 1976 and 9.9% in FY 1978.

Currently, the Department is engaged in enforcing more rigorously than in the past the requirement contained in our leases that operators diligently pursue production. We believe that this is, for the short term, increasing production in some areas; however, the increase is not significant enough to reverse the general decline. It is possible that more production could be generated by issuing regulations (in cooperation with the Department of Energy) providing for some greater diligence and even stricter enforcement. But, given the size of Federal oil resources relative to total U.S. resoures, we do not believe that this could result in a substantial increase in over-all domestic production.

Estimates of the demonstrated and inferred oil reserves in the United States are about 62 billion barrels. The range of estimates for undiscoverd recoverable resources is 50-127 billion barrels.* OCS resources constitute a major part of the estimated resources, disproportionate to its current share of U.S. production. We believe that the public lands (onshore and offshore) contain relatively great possibilities for significant new oil production. Nevertheless, even assuming acceleration so that more oil is recovered from the OCS, we believe domestic production will still not match consumption.

There is one major problem with forecasting significant increases in production from any source—timing. The Geological Survey has estimated that the time from lease sale to initial production will range from 4 to 11 years and from sale to peak productions, 7 to 14 years. These figures do not include the time from selection of general areas for lease through a sale, which would be a minimum of 1.5 years barring delays caused by judicial challenges. In some areas the time from lease sale to initial production may be as short as 1-2 years. This, of course, would lessen the time to peak production.

COAL

Consideration of oil resources should include information relative to coal since coal in some cases may be used as a substitute for oil.

In recent years, coal production on Federal lands has been increasing. From 1950-69, production varied between 5 to 10 million tons annually. This number rose to 18.9 million tons in FY 1972, to 43.6 in FY 1975 and 78.8 in FY 1978. The Federal share of total domestic production for recent years has increased from 3.2% in 1972 to 11.0% in FY 1978.[2]

In June, 1976, the Department adopted regulations applying new diligence requirements to Federal coal leases. In August, 1976, Congress enacted P.L. 94-377, which contains a statutory diligence requirement for new Federal coal leases. These diligence requirements have promoted more timely development of coal resources under leasing. The effect of diligence requirements is necessarily limited by physical constraints, however. Development of a coal mine after issuance of a lease is estimated to require from 5 to 7 years for initial production.

Demonstrated total U.S. coal reserves are approximately 438 billion short tons, 40% of which are located on or under Federal lands. It is estimated that, of this total, the coal that is actually recoverable is in the range of 219 to 260 billion tons. Assuming that U.S. consumption will reach 1 billion tons by 1985, the Federal contribution will increase to about 13%.

With additional leases these projections of potential future coal production from Federal lands would increase by 50%. At present, however, the Department is precluded by an injunction in *National Resources Defense Council v. Huges*, No. 75-1749 (D.C.C. Sept. 27, 1977) from issuing new leases until completion of a programmatic environmental impact statement. This statement is scheduled to be completed by April 30, 1979.

9

U.S. DEPARTMENT OF LABOR,
OFFICE OF THE SECRETARY,
Washington, April 24, 1978.

Honorable ROBERT MUNDHEIM,
General Counsel,
U.S. Department of Treasury,
Washington, D.C. 20220.

DEAR MR. MUNDHEIM: This is in response to your inquiry regarding the investigation of oil imports under Section 232B of the Trade Expansion Act of 1962. Enclosed is an analysis of the 1973-74 oil embargo and its effects on employment. This examines some of the direct effects of the 1973-74 interruption. Also, we have prepared an examination of the likely current effects of an interruption of imported oil supplies on employment.

We will send you shortly a discussion of some of the policy alternatives available at this time.

Sincerely,

RAY MARSHALL,
Secretary of Labor.

Enclosures.

EFFECT OF DISRUPTION OF OIL IMPORTS

EFFECT OF 1973/74 OIL EMBARGO UPON EMPLOYMENT

Between November, 1973 and March, 1974 the following changes in employment, as measured by seasonally adjusted establishment payroll data, occurred (more details are available in articles attached):

- The net direct job loss owing to energy shortages during the period was estimated between 150,000 and 225,000 or .2 to .3 percent of all nonagricultural jobs according to a special tabulation of the regular payroll reports. Direct effects are those related to an inability of an establishment to obtain sufficient fuels or electrical energy to provide power for its operation or sufficient petroleum-based products for its own use or sale.
- Some industries expected to experience direct effects (insufficient fuels) of an oil shortage posted the following job losses during the four month period according to the regularly collected payroll reports: gasoline service stations (64,000 jobs); airline transportation (after accounting for the impact of a strike, about 15,000 jobs); laundries and dry cleaning (9,000 jobs); and special trade contractors (9,000 jobs).

On the other hand, some industries likely to experience direct effects of an oil shortage posted job increases: electric, gas, and sanitary services (22,000 jobs); heavy construction contractors (20,000 jobs); and general

[1] Includes public lands, acquired lands, OCS lands, military lands and Indian lands.
* U.S. Geological Survey Circular 725 (1975).

[2] Federal leases accounted for 58.8 million tons, or 8% of domestic production, while Indian leases contributed 20 million tons, or 3%.

building contractors (13,000 jobs). The electric services industry reflected numerous conflicting factors such as the lack of petroleum to run its generators but the increased demand for electricity.

Some industries likely to experience indirect effects of an oil shortage posted the following job losses according to regularly collected payroll reports: motor vehicles and equipment (140,000 jobs); motor vehicle dealers, retail (53,000 jobs); hotels and other lodging places (27,000 jobs); and metal stampings (17,000 jobs). These indirect effects reflect insufficient demand for an industry's products arising from their potential customer's actual or anticipated inability to obtain fuel. Some sectors such as hotels and motels were related to the restricted auto travel during the period.

As measured by seasonally adjusted household data, the following unemployment changes occurred. These changes in unemployment during the four month period reflect not only the impact of the Arab oil embargo but all other factors in the economy whether oil related or other:

- During the 4-months, unemployment increased by 239,000 or .2 percentage points. This increase in unemployment occurred almost exclusively among job losers, 242,000, of whom 157,000 were on layoff and 85,000 were not on layoff. The unemployed persons who were entering for the first time or reentering the labor force increased 36,000; unemployed persons who left their last job declined 66,000.
- During the 4-months, unemployment among nonfarm occupation rose 52,000 for white collar workers; 113,000 for blue collar workers and 13,000 for service workers. Unemployment by farm occupations declined 1,000. The remaining unemployed persons had no previous work experience.

These data illustrate the employment and unemployment changes occurring during late 1973 and early 1974. Do these data reflect only the embargo impact or do they signal the beginning of the 1974-75 economic recession?

- The 1973/74 employment decline occurred in only 47 percent of all private industries. During 1960 and 1970 recessions, employment declines over a 4-month period occurred in about 70 percent of all industries.
- The total employment declines in all the private nonagricultural industries was only .1 percent during 1973-74 compared to an .9 percent decline during the 1960 and 1970 recession.
- The duration of employment declines by industry during 1973-74 period was less than during two earlier recessions. Only 24 percent of all private industries experienced 6-month declines during 1973-74 while 41 percent and 56 percent experienced 6-month declines respectively during the 1960 and 1970 recessions.

These few statistics suggest the 1973-74 problems were related to energy, not the beginning of a business cycle. The problems were limited to fewer industries and of smaller magnitude than might be expected during a business cycle. Further, these changes particularly affected the energy related industries. However, November, 1973 has been designated as the beginning of the 1974-75 recession.

EFFECT OF INTERRUPTION OF OIL SUPPLIES

These data illustrate the employment impact of the 1973-74 oil disruption. However because of numerous changes since 1973, the impacts might be different in 1978. For example, the oil embargo and higher oil prices were a surprise in 1973; the higher oil prices are well known in 1978 and, perhaps, all concerned might be better prepared. As the recent coal strike illustrates, what seems like a large change in the supply of a good can have a small impact on other industries over a relatively short period. Also, a strategic petroleum reserve is being prepared.

Still, the best estimate of the effects of an oil interruption in 1978 remains the 1973 experience. Thus, an interruption in U.S. oil supply of the same magnitude and same duration as the 1973-74 embargo would likely impact upon 400,000-575,000 jobs or 150,000-225,000 direct jobs and 250,000-350,000 indirect jobs. Further, unless there were important differences in how the burden was shared among industrial, households or automotive users the industrial and occupational impact would very likely be similar to that which occurred in 1973-74. If the magnitude and duration of an oil interruption were greater, i.e. doubled, these employment effects could easily double, 300,000-450,000 direct jobs and 500,000-700,000 indirect jobs would be affected.

10

U.S. DEPARTMENT OF COMMERCE,

WASHINGTON, D.C.,
September 14, 1978.

MR. ROBERT H. MUNDHEIM,
General Counsel,
Department of the Treasury,
Washington, D.C.

DEAR MR. MUNDHEIM: This is in reply to your letter of April 3 requesting the Department's comments on the impact of petroleum and petroleum products imports on the national security of the United States. We understand that you are conducting an investigation of this matter under authority of Section 232(b) of the Trade Expansion Act of 1962 as amended, 19 U.S.C. 1862(b).

Increasing Dependency on Foreign Supply

Any assessment of the national security implications of our oil imports has to start from the fact that within the last five years the Nation has become increasingly dependent upon foreign supply. During 1972, the last full year before the Arab embargo, oil imports into the United States amounted to 4.7 million b/d, or 29 percent of domestic consumption. In 1977, oil imports reached 8.7 million b/d, or 47 percent of domestic consumption. A variety of initiatives now underway may reverse this trend, but, under most assumptions, it appears safe to conclude that our foreign dependency will exceed 40 percent over the next few years.

This fact tends to overwhelm all other considerations. It emphasizes the increased vulnerability of the U.S. economy to interruptions of foreign supply, even if the interruptions were not to extend to all foreign sources.

In general, it can be said that in the last five years our economy has been in a race between building increasing adaptability to supply interruptions (a response to the lessons of the 1973/74 embargo) and accepting increased dependency on foreign supply. This implies that the effects of a future interruption will almost certainly differ from those experienced in 1973/74. This also implies, however, that, for whatever reasons, the Nation now stands more exposed to the possibility of interruption than heretofore. In short, the risks of interruption seem to have outrun whatever we might hope for in the way of slightly diminished penalities of interruption.

In response to your specific questions, we submit the following:

(1) *Damage to the Economy from 1973/74 Arab Oil Embargo.* The effects of the 1973/74 embargo were minimized by forceful Federal responses which shifted the impact of reduced supply onto final demands for petroleum products and then limited consumers access to those products, notably gasoline. As a result, during the embargo period, inventories of petroleum products mounted rather than declined, except for a 16 percent dip in residual fuel oil.

On the supply side of the economy, sufficient shortage arose to impact significantly on the petrochemical industry. On the demand side of the economy, the uncertainty associated with limited access to gasoline and other transportation fuels led to a significant drop in automobile sales and services associated with automobile and air travel. This uncertainty was sufficient to have an adverse impact in the con-

sumer durable and housing construction sectors as well.

(2) *Economic Impact of an Oil Supply Interruption Now or in the Near Further.* We assumed for purposes of this review a crude oil impact of about 4 mm b/d occurring in the late 1970's or early 1980's and lasting at least six months beyond a significant drawdown of domestic inventories and stored reserves. We postulated final demand reductions comparable to those which occurred in 1973/74 and passed them through models to check for their consistency with a loss of about 4 mm b/d of imported crude oil. We then modeled the results and found a range of impacts in the order of 1.1 to 1.5 million additional unemployed and a 2 to 3,6 percent decline of 1977 GNP, or $40 to $65 billion (1977 dollars).

(3) *Sectoral Impacts.* We find that a 4 mm b/d reduction in crude oil imports will impact heavily first on the refining industry, most certainly leading to some refinery closings. In turn, this impact will increase the shortage in terms of refined products somewhat above 4 mm b/d, possibly as high as 6 mm b/d (some of which may be offset by an increase of product imports). The next impact will be on the petrochemical industry, probably in the order of a $800 million reduction in shipment, with a decrease in employment of 80,000.

Other sectors will be impacted by decreases in demand as during the 1973/74 embargo, but on a larger scale.

(4) *Overall Judgment.* In our judgment, present levels of oil imports do threaten to impair the national security. Our postulated 4 mm b/d reduction is approximately 50 percent of what our oil imports are expected to be in the early 1980's—4 mm b/d would be equivalent to about 20 percent of domestic consumption. Impacts in the order or $40 to $65 billion decline in GNP, with very adverse impacts on key industries (petroleum refining, petrochemical and automotive), pose such a threat. Of course, given a predicted foreign dependency in the 40-50 percent range, a total cutoff of foreign supply would lead to adverse impacts well beyond those identified above. Still, in our judgment, a 20 percent reduction is more plausible, and, as demonstrated it would suffice to harm the economy.

We appreciate the opportunity to work with you on this investigation. Following the investigation, as you work toward policy and procedural alternatives, we hope we may continue to work closely with you.

Sincerely,

JERRY J. JASINOWSKI,
Assistant Secretary For Policy.

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